Attachment BR-201B5

Revised Draft Biological Assessment for the Cosumnes Power Plant, Sacramento County, California

Prepared for

Sacramento Municipal Utility District

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March 10, 2003

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1.0 Introduction

The Sacramento Municipal Utility District (SMUD) proposes to develop a 1,000-megawatt (MW) natural gas-fired power plant (the Cosumnes Power Plant [CPP]) and 26-mile natural gas pipeline in southern Sacramento County (the proposed action). The purpose of this biological assessment (BA) is to review the proposed CPP project in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, proposed, or sensitive species, critical habitat for winter-run Chinook salmon and Delta smelt or Essential Fish Habitat (EFH) for Pacific Salmon.

This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536(c) 50 CFR 40214). The U.S. Army Corps of Engineers is the lead federal agency for the proposed project and will oversee compliance with federal laws, ordinances, regulations, and standards (LORS) for the project, as well as any mitigation and protection measures for sensitive biological resources.

The lead state agency for the CPP project is the California Energy Commission (CEC) that oversees licensing and compliance of LORS for thermal power plants under its jurisdiction. An Application for Certification (AFC) for CPP was prepared under Title 20 of the California Code of Regulations and was submitted to the CEC on September 13, 2001. The AFC process under CEC regulations is the functional equivalent to the California Environmental Quality Act (CEQA) EIR. The CEC is the lead state agency for the project and will oversee compliance with state and federal LORS required for the project, as well as any mitigation and protection measures for sensitive biological resources. The AFC presents a detailed description of the project and addresses potential project impacts to sensitive biological resources in the project area. This BA further refines the analysis of impacts to special-status species that occur, or could potentially occur, in the CPP project area. This BA also addresses state-listed species as it may be used during consultation with the California Department of Fish and Game (CDFG) under Fish and Game Code Section 2081 or 2080.1.

Organization of BA

Information on special-status species in the action area, the project's potential effects on these species, and proposed mitigation (Sections 2-6 of the BA) is provided in two parts. Part one addresses terrestrial species. The BA sections discussing these species are identified as Section 2A-6A. The second part of the BA contains the pertinent information on aquatic species. BA information on aquatic species is contained in Section 2B-6B. These sections follow the sections on the terrestrial species. Section 1 which addresses the Project Location, Lists of Special-Status Species, Critical Habitat, Essential Fish Habitat, Consultation History, Description of the Proposed Action Area, and Project Schedule includes both terrestrial and aquatic species.

1.1 Project Location and Description of Proposed Action

The project has temporary disturbances and permanent features. The project site is a permanent feature on a 30-acre parcel and is hereafter referred to as the "site." The CPP project site is located 25 miles southeast of the City of Sacramento, on the eastern edge of the Sacramento Valley in Sacramento County (see Figure 1, all figures are located at the end of the document). The project would be located on a 30-acre parcel about 1,500 feet south of the existing non-operational Rancho Seco Plant (Rancho Seco or RSP) on a portion of a 2,480-acre site owned by SMUD (Figure 2). This location will allow the reuse of existing water systems, switchyards, and transmission lines that are already in place at Rancho Seco. The project is at 150 feet elevation, at the base of the foothills that rise to the Sierra Nevada east of the project. The 0.3-mile water supply line and 0.4-mile electrical transmission line connecting existing RSP features and the CPP site are in the same location and habitat as the project site. Construction of the interconnecting buried water supply line is a temporary disturbance. Stringing the transmission lines would be a temporary disturbance, while the transmission tower footings would be a permanent feature. There would be a temporary, 20-acre construction laydown area just south of the project site. Use of this area would require re-aligning portions of two ephemeral drainages to go around the laydown area and to align with the drainages north of Clay East Road. The construction access road built on SMUD-owned property would be a permanent feature. The site is located on the Goose Creek quadrangle, United States Geological Survey (USGS) at Section 29, Township 6N, Range 8E.

Power Plant

CPP will consist of a nominal 1,000-megawatt (MW) combined-cycle natural gas-fired power plant. The plant will be constructed in two phases, each consisting of 500 MWs. Each phase will have two combustion turbines, one condensing steam turbine, and two heat recovery steam generators (HRSGs). Construction of CPP will require that 30 acres of annual grassland be leveled and elevated for the CPP footprint and an electrical switchyard (Figure 2). A construction access road will also be built, which will be used for plant deliveries during operation. These features will result in the permanent loss of annual grassland that includes seasonal wetland and vernal pool habitats. Preparation of the CPP site also requires permanent realignment of two intermittent swales. The swales currently run from south to north through the center of the site, primarily flow only during the rainy season, and will be realigned to the west and east sides of the site, where meandering flow will join with Clay Creek to the north of the site. Swales in the laydown area would be realigned to match with the swales circumventing the power plant site.

Gas Pipeline

Natural gas for the facility will be delivered via a new 24-inch-diameter pipeline extending 26 miles from SMUD's existing transmission backbone pipeline network that currently terminates at the Carson Ice-Gen Facility in Elk Grove. The new gas pipeline crosses several roadways and is adjacent to railroad rights-of-way in the south County, crosses under several foothill streams and irrigation ditches typical of the Sacramento Valley, and then lies adjacent to the road right-of-way (ROW) along Twin Cities Road and Clay East Road, in predominantly hay fields, alfalfa fields, and vineyards. The gas pipeline alignment is located in the Clay, Galt, Elk Grove, Bruceville, and Florin quadrangles.

Construction of the natural gas pipeline would require three construction methods, the conventional open-cut trench method, horizontal directional drill (HDD), and jack-and-bore. The open-cut trench method requires a 35 to 65-foot wide construction zone that includes area for a 3- to7-foot-wide, 7-foot-deep trench, separate topsoil salvage and trench spoil piles and vehicle/equipment access along the entire alignment. The HDD method would be used to install the natural gas pipeline under the Cosumnes River, Badger Creek, Laguna Creek, portions of the Cosumnes Preserve, and Highway 99. The HDD will require the use of a bentonite lubricant during the drilling process. Bentonite is a non-toxic clay material often used in farming and wetland construction. Jack-and-bore is used for crossing under small obstacles such as roads and railroad tracks, and consists of digging two pits and using a hydraulic jack to bore the pipe underneath the obstacle.

In order for the new 26-mile gas line to supply sufficient fuel for Phase 2 of the project, two gas compressor stations will be constructed as part of CPP's Phase 2 activities. One gas compressor will be located near the Carson Ice-Gen site at an existing valve station, in the Sacramento Regional Waste Water Treatment Plant buffer lands (Figure 3). Two existing gravel access roads lead into the site; one from the west and the other from the south. The new compressor is anticipated to be skid mounted, approximately 10 feet x 20 feet x 8 feet high, surrounded on four sides by a block wall for noise attenuation, in an existing fenced enclosure.

The other gas compressor will be added in an existing gas interconnection facility in Winters, CA where the SMUD pipeline ties-in to PG&E's main backbone Line 400 (Figure 4). The Winters Compressor Station is located on Road 29 in the SE 1/4 of Section 29, T9N, R1W in Yolo County. The new compressor is anticipated to be skid mounted, approximately 10 feet x 20 feet x 8 feet high, surrounded on four sides by a block wall for noise attenuation. The existing inter-tie station is currently surrounded by a slatted fence enclosure. The area is surrounded by orchards, with the nearest residences about 0.1 mile away.

Other Project Features

The CPP project will include the following associated features:

- A stormwater detention basin and discharge outfall structure to Clay Creek (a tributary to Hadselville Creek and Laguna Creek) will be located in the northwest corner of the CPP site. The outfall from the basin would be designed to incorporate measures to reduce contaminants, consistent with stormwater requirements, and with a flow dissipater structure or equivalent to reduce velocity and potential scouring from the outfall. Construction of the 100-foot-long stormwater discharge pipeline would result in temporary disturbance to 0.3 acre of pasture, annual grassland, and seasonal swale in the 30 acres. The open-cut trench method would be used to construct the stormwater discharge pipeline.

- New triple circuit 0.4-mile long 230-kV transmission lines will extend north northeast from the proposed switchyard at the CPP site to the existing Rancho Seco Plant's 230-kV switchyard. Approximately 4 new steel pole transmission towers will be required.

- An existing 66-inch diameter buried pipeline conveys water from Folsom-South Canal to the Rancho Seco Plant. Water for cooling CPP will be supplied by a new 0.3-mile 20-inch diameter pipeline connection to the existing water facilities at Rancho Seco. FSC diverts

water from the American River at Lake Natoma. Phase 1 of the plant would use approximately 220 acre-feet per month, or 1,719 gpm or 3.7 cubic feet per second. Phase 2 of the plant would use approximately 220 acre-feet per month or 1,719 gpm, or 3.7 cubic feet per second. The water pipeline connection will require a 65-foot-wide construction corridor resulting in temporary disturbance to 1.3 acres of pasture, annual grassland, and seasonal swales.

- A Zero-liquid Discharge (ZLD) system will process all of the wastewater produced by the plant, returning a relatively high quality distillate stream for reuse in the plant and producing a solids waste stream suitable for disposal in a landfill. Wastewater will be processed in two steps; first a brine concentrator will concentrate the wastewater to approximately 15 percent salt concentration and produce a clean distillate stream. The second step will further process the remaining wastewater, producing a clean distillate stream and a salt cake. ZLD systems will be used for both Phase 1 and Phase 2 of CPP.
- Domestic water and process makeup water will be supplied by diverting a portion of the cooling water from the Folsom-South Canal to a package treatment plant.
- A temporary 20-acre construction laydown area would be located in annual grassland immediately south of the CPP site, south of Clay East Road. Two swales, an east and a west swale, currently run through the portion of land selected for the laydown area. The laydown area will be arranged in a polygon shape to avoid alteration of the swales, except where the northward flow approaches Clay East Road. Here, the earth will be graded to direct flow toward a new culvert system that directs natural drainage under Clay East Road and around the plant site. The laydown area will be revegetated to annual grassland after construction is complete.

Climate

The region's climate is Mediterranean, characterized by hot, dry summers and cool, wet winters. Summer high temperatures frequently exceed 100 degrees Fahrenheit (°F); winter temperatures are generally mild, with fewer than 20 freezing days per year. Rainfall averages 16.7 inches per year, most of which falls between November and March.

1.2 Time Line and Implementation Schedule

SMUD expects to begin construction of the CPP facility in the first quarter of 2003 and begin operation of Phase 1 in 2005. The natural gas pipeline construction would encompass two dry seasons, between spring of 2003 and summer 2004, when low water flows are expected in the Cosumnes River and tributaries, and to reduce potential environmental impacts to aquatic species. The CPP would have an operational life of approximately 30 years and would operate 7 days per week, 24 hours per day.

1.3 Action Area

The action area for the CPP project includes the Cosumnes River, the lower American River (Nimbus Dam downstream to the Sacramento River confluence), Sacramento River downstream of the confluence with the American River, and the Sacramento County

portion of the Central Valley. The Cosumnes River is affected because the pipeline crosses the mainstream and several tributaries to the Cosumnes. Because the project would use water diverted from the American River, the lower American River and Sacramento River are also considered part of the action area. The Central Valley contains habitat for large numbers of migratory birds that winter in the cultivated agricultural fields, pastures, and Sacramento-San Joaquin delta areas. The Central Valley also contains a wide variety of vegetation communities that support special-status plants and wildlife. Vegetation communities in the project area include annual grasslands with swales and seasonal wetlands, grazed pastures, cultivated agricultural land, wetlands, and cottonwood, Valley oak, and willow riparian habitats. Wetland and waters of the U.S. include vernal pools, intermittent and perennial streams (Clay, Badger, and Laguna creeks), swales, and the Cosumnes River. In addition to named streams and creeks, the gas pipeline would cross 37 swales, irrigation ditches, drainages or other aquatic features that could be considered functionally equivalent to "streams" under the definitions implied by the State of California. Therefore, CPP has obtained Streambed Authorization pursuant to Section 1601 of CDFG code to cross these features.

Portions of the natural gas pipeline from the Sacramento Regional Wastewater Treatment Plant to the town of Franklin are in residential and commercial areas in the cities of Sacramento and Elk Grove. The pipeline runs close to and parallel to the railroad tracks or existing roads through most of this area.

A portion of the Cosumnes River and Cosumnes River Preserve are included as part of the action area. The Cosumnes Preserve was developed to protect the natural river ecosystem including riparian and freshwater marsh habitats. The Preserve maintains one of the last remaining valley oak riparian forests in California and portions of the Preserve have been selected as a national Natural Landmark. The Cosumnes River is one of the last rivers in California without dams; it routinely overflows its banks and provides sediments and nutrients to adjacent flood plains, riparian habitats, and wetlands. Portions of the Cosumnes Preserve are managed by the California Department of Fish and Game (CDFG) and other portions by The Nature Conservancy.

Cooling water for the project would come from FSC, which originates at Lake Natoma downstream of Folsom Reservoir on the American River.

The CPP project will result in direct and indirect impacts to biological resources in the action area. These impacts include temporary and permanent disturbance to Central Valley habitats and wildlife. The CPP project impact areas will temporarily affect approximately 240 acres for pipeline construction and laydown areas, and permanently convert 30 acres of habitat in the Central Valley to industrial use.

1.4 List of Special-Status Species

A list of special-status species that could occur in the project area was compiled from consultations with U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), CDFG, and the California Natural Diversity Data Base (CNDDB; CDFG 2002) (Appendix A). Recorded locations of special-status species, according to the CNDDB search are shown in Figures 5 through 9. For the purposes of this analysis, only those

species identified by the agencies as species of concern for the CPP project are fully addressed in this biological assessment. Any special-status species whose habitat is present in the CPP project area was evaluated for potential impacts from construction, operation, and maintenance activities. Other special-status species that were included on the USFWS, CDFG, and NMFS lists whose habitats or known boundaries of distribution do not occur in the project area are included in Table 1 (found at the end of this BA), but were not evaluated further.

Federal Threatened (FT), Endangered (FE), Proposed Threatened (PT) or Proposed Endangered (PE) Species:

Sacramento Orcutt Grass *(Orcuttia viscida)* FE

Vernal pool tadpole shrimp (*Lepidurus packardi)* FE

Vernal pool fairy shrimp (*Branchinecta lynchi*) FT

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) FT

Spring-run Chinook salmon (*Oncorhynchus tshawytscha*) FT

Winter-run Chinook salmon (*Oncorhynchus tshawytscha*) FE

Sacramento splittail (*Pogonichthys macrolepidotus*) FT

Central Valley steelhead (*Oncorhynchus mykiss*) FT

Giant garter snake (*Thamnophis gigas*) FT

Bald Eagle (*Haliaeetus leucocephalus*) FT (proposed Delist)

Federal Candidate Species (C) and Species of Concern (SC)

American Peregrine Falcon *(Falco peregrinus anatum)* SC, SE

Sacramento Orcutt Grass *(Orcuttia viscida)C, SE*

Legenere (*Legenere limosa*) SC

California linderiella (*Linderiella occidentalis*) SC

Fall/late fall -run Chinook salmon (*Oncorhynchus tshawytscha*) C

California tiger salamander (*Ambystoma californiense*) C

Western pond turtle (*Clemmys marmorata*) SC

Western burrowing owl (*Athene cunicularia*) SC

Tricolored blackbird (*Agelaius tricolor) SC*

State* Threatened (ST), Endangered (SE), Species of Special Concern (SSC), Fully-Protected (FP)

Swainson's hawk (*Buteo swainsoni*) ST

Greater sandhill crane (*Grus canadensis tabida*) ST, FP

*These species are state-only listed species, fully-protected species, and other California species of special concern that may or may not have federal status (see Table 1).

The assessment also addresses Pacific salmon, including winter-run, spring-run, fall/late-fall run Chinook salmon since the proposed project area occurs in the area designated as Essential Fish Habitat for the species.

1.5 Critical Habitat

The project site does not include designated critical habitat for any terrestrial species listed above. Critical habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp has been proposed in south Sacramento County that includes portions of the pipeline and project site.

Critical habitat for Sacramento River winter-run Chinook salmon includes the Sacramento River (including the river water and river bottom) and adjacent riparian zone (FR Vol. 58 No. 114). The American and Cosumnes rivers are not designated as critical habitat for winter-run Chinook salmon.

Critical habitat for Central Valley spring-run Chinook salmon and Central Valley steelhead was identified by NMFS to include all river reaches accessible to listed Chinook salmon in the Sacramento River and its tributaries. Critical habitat designated for these two species has been withdrawn by NMFS pending additional analyses.

Critical habitat for delta smelt has been designated by USFWS to include the Sacramento River, downstream of the confluence with the American River, and the Sacramento-San Joaquin Delta.

Critical habitat has not been designated by USFWS for Sacramento splittail.

1.6 Essential Fish Habitat

In the project area, the Sacramento River, lower American River, and Cosumnes River are located in the area identified as Essential Fish Habitat for Pacific salmon. Fall-run Chinook salmon are known to inhabit the Cosumnes and lower American rivers. Winter-run, spring-run, late-fall run/fall-run Chinook salmon are known to inhabit the Sacramento River.

1.7 Consultation to Date

- March 7, 2001. Informal consultation with Chris Nagano, USFWS regarding special-status species listing.
- April 30, 2001 Consultation Letters to USFWS, CDFG, and ACOE regarding project scoping.
- July 17, 2001. Letter from CDFG responding to request for consultation and acknowledging need for 1600 permits and CEQA assessment.
- August 24, 2001, pre-consultation technical assistance with NMFS concerning potential impacts to winter-, fall/late fall-, and spring-run Chinook salmon, Central Valley steelhead, critical habitat

- December 11, 2001, pre-consultation technical assistance with Madeline Martinez of NMFS regarding potential project impacts and need for mitigation.
- January 11, 2002. Letter from USFWS commenting on AFC for project.
- January 17, 2002. Letter from Applicant to USFWS responding to concerns of January 11, 2002 and requesting meeting.
- February 7, 2002 Pre-consultation meeting with ACOE, USFWS, (CEC was also present) pre-consultation meeting to brief ACOE, USFWS about project. Invited participants CDFG and NMFS did not attend. Objective was to identify permit requirements application requirements and appropriate mitigation for project.
- February 20, 2002 Revised Species List for the Cosumnes Power Plant Gas Pipeline sent to Debra Crowe from Harry Mossman.
- April 5 and 8, 2002, Keith Whitener, The Nature Conservancy, Cosumnes River Preserve fisheries biologist, discussions of potential impacts to fish in Cosumnes River and Badger Creek from wastewater discharge and construction of pipeline through preserve.
- April 5, 2002, Mike Eaton, Cosumnes River Preserve Manager, discussion to determine potential impacts to Cosumnes Preserve from Project.
- May 10, 2002 Progress meeting with Ken Fuller, USFWS concerning wetland mitigation and presentation of final pipeline alignment.
- September 19, 2002 Progress meeting with Ken Fuller, Craig Aubrey, Jason Douglas (USFWS) and Melinda Dorin, Kristy Chew (CEC) to discuss segment 3a realignment, receive preliminary comments on the draft Biological Assessment and clarify determination of upland impacts to Giant Garter Snake, and indirect impacts to vernal pool fairy shrimp.
- October 15, 2002 Progress meeting with Ken Fuller, Craig Aubrey, Jason Douglas (USFWS) and Melinda Dorin, Kristy Chew (CEC) to review draft mapping of impacts to GGS and fairy shrimp and determination of upland impacts to giant garter snake, and indirect impacts to vernal pool fairy shrimp.
- November 6, 2002 Field visit with USFWS
- November 14, 2002 John Baker NMFS, concerning project water supply and potential impacts to fish species under NMFS jurisdiction.
- November 15, 2002 Meeting with ACOE in field to verify wetland delineation of plant site and laydown area.
- December 12, 2002 Letter from ACOE requesting additional data along the pipeline alignment.
- January 14, 2003 Meeting with SMUD, Wayne White, Justin Ly USFWS to identify progress
- February 7, 2003. Submit Final Wetland Delineation report. Accepted by ACOE.

1.8 Current Management Direction

A portion of the CPP natural gas pipeline project is proposed to go through the Cosumnes River Preserve in Sacramento County. The Cosumnes River Preserve is jointly owned by The Nature Conservancy, Bureau of Land Management, Ducks Unlimited, CDFG, Sacramento County Department of Regional Parks, Recreation and Open Space, and California Department of Water Resources (DWR). The overall goals of the Preserve are to restore riparian habitat in the Cosumnes River watershed and to protect and maintain habitat for native plants and wildlife.

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2.0A Special-Status Terrestrial Species Accounts and Status in the Action Area

The designation of special-status includes: federal- and state-listed species under either the Federal or the California ESA, species proposed for those listings, federal Species of Concern, California Species of Special Concern, California Fully-Protected Species under the Fish and Game Code, and plant species designated as rare, threatened, or endangered by the California Native Plant Society (CNPS). A comprehensive list of special-status species that could occur in the project area is included in Table 1. Special-status species whose habitat(s) and distribution is present in the CPP project area are addressed in this section and evaluated for project impacts and mitigation. Other special-status species that were included on the USFWS, CDFG, and CNPS lists whose habitats or known boundaries of distribution do not occur in the project area are included in Table 1 and evaluated in Section 2.1 but not evaluated for project impacts and mitigation.

Field surveys that focused on habitat suitability and searches for special-status species were conducted on the entire CPP site, in a mile of the site, and 2,000-foot corridor along the gas pipeline and electric transmission line alignments. Botanical surveys for special-status plants focused on the proposed construction disturbance areas. Figures 5 through 9 show locations of known species occurrences.

Indirect and direct permanent, temporary, and operational project effects were analyzed for impacts to special-status species from the CPP project. Proposed protection and mitigation measures for impacts to special-status species are presented in Section 5.0A Tables 2, 3 and 4 provide summaries of these potential impacts to the wetlands and native vegetation communities in the project area resulting from the construction and operation of CPP and associated linear facilities.

2.1A Terrestrial Species Known or Assumed to Occur in the Project Area

Special-status terrestrial species known to occur or which are assumed to occur in the project area were identified through informal consultation with USFWS and CDFG, discussions with The Nature Conservancy regarding the Cosumnes River Preserve, and field surveys for the project. The species addressed in this BA are dependent in some way on aquatic habitats such as river, creek, vernal pool, emergent marsh, or the adjacent riparian habitats. The following sections discuss the potential impacts to special-status species from the CPP project.

2.1.1A Federal Listed Terrestrial Species

2.1.1.1 Sacramento Orcutt Grass

The **Sacramento orcutt grass** (*Orcuttia viscida*) is a Federal and state endangered and CNPS 1B species. It is an annual herb that occurs in vernal pool habitats, blooming from May to June after pools dry. CNDDB records show historic occurrences of Sacramento orcutt grass approximately 2 miles from Rancho Seco. This species is seriously threatened by agriculture, urbanization, and grazing where vernal pools are lost or degraded (Skinner and Pavlik, 1994). Initial surveys for this species were done in conjunction with the wetland delineation for the project and specifically for the project site by Davis Environmental Consultants (Davis 2001). Additional surveys were conducted during the blooming period. Orcutt grass was not detected in the project construction areas and therefore the CPP project is not expected to affect the Sacramento orcutt grass.

2.1.1.2A Vernal Pool Tadpole Shrimp and Fairy Shrimp

Vernal pool tadpole shrimp (*Lepidurus packardi*), a federal endangered species and **vernal pool fairy shrimp** (*Branchinecta lynchi*), a federal threatened species (collectively referred to as vernal pool branchiopods) are California endemic species, that live their entire life cycle in temporary pools that fill with rainwater. They occur in ponding areas such as vernal pools, swales, seasonal wetlands, or depressions that hold water for at least 18 days (at 20 °C) or 41 days (at 15° C) during the wet season. Tadpole shrimp require a minimum of 25 days to mature and mean age at reproduction is 54 days (Federal Register Vol 67, No. 185. P 59901). Vernal pool branchiopods lay eggs (cysts) as the pool dries and persist in the encysted egg stage during the summer dry periods. These particular species are endemic to vernal pools and swales in California's Central Valley (Federal Register 1994), but they are also known to inhabit scrapings, tire tracks and other artificial depressions (USFWS 1996). The USFWS in proposing critical habitat for vernal pool crustacea identified the Primary Constituent Elements (PCE) that provide the necessary features of critical habitat. Briefly stated, the two PCE for vernal pool fairy shrimp and vernal pool tadpole shrimp are 1) vernal pools or ephemeral wetlands of appropriate size and depth and 2) the geographic, topographic and edaphic features that support vernal pool complexes (Federal Register Vol 67, No. 185. September 24, 2002). Where topsoil has been removed from the depression by grading or scraping, or where water is prevented from collecting, the population of fairy shrimp in that pool could be lost because the PCEs are no longer present.

Suitable but degraded habitat exists for vernal pool fairy shrimp in the low depressions near or in the Union Pacific railroad right-of-way and Laguna-Stone Lakes Preserve along the gas pipeline and the vernal pool north of the CPP project site. Surveys for listed vernal pool branchiopods were not conducted specifically for the CPP project, as the USFWS indicated during pre-consultation technical assistance that protocol survey results showing absence would not be accepted. Vernal pool branchiopods are presumed to be present in the vernal pools and seasonal depressions at the site and along the gas pipeline alignment that hold water for a long enough period.

Construction of the CPP footprint may result in the direct loss of some ponding habitats. In addition, the gas pipeline construction corridor contains seasonal ponding areas that could support protected vernal pool species. The CPP project may adversely affect vernal pool

tadpole shrimp, vernal pool fairy shrimp, and vernal pool plants that may occur in the wetlands. Mitigation is proposed for the loss of wetlands along the pipeline and on the site (see Section 5.0A).

2.1.1.3A Conservancy Fairy Shrimp

The **Conservancy fairy shrimp** (*Branchinecta conservatio*) is a Federal endangered branchiopod. Conservancy fairy shrimp inhabit relatively large vernal pools and are known from six disjunct populations in Tehama, Butte, Solano, Glenn, Merced, and Ventura counties (Federal Register 1994). This species is not known to occur in Sacramento County.

Reasons for decline of the Conservancy fairy shrimp include loss of vernal pool and other seasonal wetlands to farming and development. The CPP project will not adversely affect Conservancy fairy shrimp.

2.1.1.4A Valley Elderberry Longhorn Beetle

The **valley elderberry longhorn beetle** (VELB) is listed as a federal threatened species. The VELB is dependent on its host plant, elderberry (*Sambucus* sp.). Adults feed on elderberry foliage and flowers.

The VELB requires the presence of mature elderberry plants to complete its 2-year life cycle. The animal spends most of its life in the larval stage, living in the stems of an elderberry plant. The adult stage is short-lived. Females lay eggs in crevices of the bark in late June. The larvae normally occupy elderberry stems, trunks, and roots greater than 1 inch in diameter. Larvae and pupae remain in the stems for one to two years until emergence as adults in the spring. Adult emergence is from April through June, about the same time the elderberry produces flowers. External sign of the species on elderberry shrubs is limited to exit holes created by adults chewing their way out of the stems after pupation.

The VELB's range extends throughout California's Central Valley and associated foothills. Waterways that drain to the Sacramento-San Joaquin delta and support elderberry plants are considered habitat for VELB. Sacramento County is included in the list of 31 counties that have VELB in all or portions of their areas.

Seven isolated (not associated with riparian vegetation) blue elderberry shrubs (*Sambucus mexicanus*) are located along the gas pipeline alignment. Two are located on the eastern edge of the UPRR between Laguna and Elk Grove Boulevard, two are located along the UPRR at the point where the pipeline crosses under the UPRR approximately 70 feet south of Elk Grove Boulevard, and three are located adjacent to the north levee road of the Cosumnes River. The former four are potentially within 100 feet of construction and will require special monitoring and avoidance measures described in Section 5.0A. The latter three are located over a portion of the line that would be installed by HDD and therefore would not be affected. Sixteen more elderberries were located in riparian habitats in the Cosumnes River Preserve at distances between 150 and 500 feet from the pipeline. These will be avoided by construction. The riparian habitats of the Cosumnes Preserve, including elderberry plants, will be avoided by using horizontal directional drill (HDD) to place the gas pipeline under sensitive areas. If a frac-out (e.g. inadvertent returns of drilling mud enter the waterway through a fissure or crack in the soils) were to occur from HDD, the

elderberry shrubs would most likely not be affected, as clean up of the drilling mud would not remove shrubs.

The CPP project may affect, but will not adversely affect VELB.

2.1.1.5A Giant Garter Snake

The **giant garter snake** (*Thamnophis gigas*), a Federal and California threatened species, is one of the largest garter snakes in North America. It is olive to dark brown with pale yellow stripes running down the back and both sides. It is highly aquatic, requiring marsh habitat (including flooded rice fields). The snakes also require a consistent source of small fish, amphibians, or other aquatic prey species in slow moving sloughs, creeks, rivers, ponds, and irrigation canals. Giant garter snake habitat is defined as any wetland, canal, or slough suitable for foraging (containing fish and amphibians), and upland habitat (defined as areas within 200 feet of aquatic habitats) (Hornaday 1997) within 5 miles of a recorded locality. The Cosumnes River, Badger Creek, and irrigated crops, canals and associated upland areas support aquatic species that provide forage for giant garter snakes.

The Sacramento County rice production zone and the eastern portion of the Sacramento-San Joaquin river delta from the Laguna Creek-Elk Grove region south to Stockton supports populations of giant garter snake (Federal Register 1993, Thelander 1994). The CNDDB has a record of giant garter snakes occurring in the large marsh at the confluence of the Cosumnes River and Badger Creek west of Highway 99 and another in a marshy ditch south of Arno Road just east of Highway 99. Cosumnes Preserve staff report giant garter snakes occur in the preserve but Laguna Creek has not been surveyed.

Giant garter snakes hibernate in underground burrows in upland areas adjacent to aquatic habitats during the winter months, typically from November through March (USFWS 1999). During the hibernation period they are susceptible to earth moving activities while in underground burrows. The snakes are normally active (breeding or feeding) from early March through September but have been observed above ground as early as February and as late as October in some areas (Wylie 1997). For consultation purposes, the USFWS typically refers to the winter hibernation period as October 1 to May 1 as this is the period when most, if not all, snakes are in hibernation.

Reasons for population decline include loss of forage habitat in natural steams and wetlands and supporting upland habitat, disruption during basking and hibernation, direct loss of individuals through predation by native and introduced species, and degradation of water quality. The proposed action may result in temporary impacts to the giant garter snake during earth moving activities, such as construction of the CPP gas pipeline trench.

There is no suitable giant garter snake habitat at the CPP project site, and none was reported during field surveys for tiger salamander and other amphibians (Jennings 2002). Along the gas pipeline, giant garter snake are known to occur in the Cosumnes River and Badger Creek and are assumed to be present in nearby tributaries with appropriate cover, hydrology and prey. Roads and railroads are believed to be effective barriers where the pipeline parallels a railroad berm or heavily traveled highway. The CPP project was designed with a concern to avoid aquatic habitat to the extent feasible.

Giant garter snakes have been documented to move up to 5 miles over a period of a few days in response to dewatering of habitat (Wylie *et al. 1997 in* USFWS 2002). Telemetry studies also indicate that active snakes use uplands extensively –more than 31 percent of the observations were in uplands (Wylie 1999 *in* USFWS 2002).

> "Almost all snakes observed in uplands during the active season were near vegetative cover, where cover exceeded 50 percent in the area within 0.5 m of the snake. Less than 1 percent of observations were of snakes in uplands with less than 50 percent cover nearby (Wylie 1999 *in* USFWS 2002). "

The draft recovery plan for the snake designated four recovery units for the snake. The pipeline for the CPP project is within the Sacramento County Valley Recovery Unit, which comprises seven populations. "Five of the six remaining population within the recovery unit are very small, highly fragmented and isolated, and, except for the Badger Creek/Willow Slough population, threatened by urbanization. This latter population is within a small isolated area…these subpopulations are largely protected from threats to the species…" (USFWS 2002)

The portion of CPP gas pipeline extending through the Cosumnes Preserve could temporarily affect giant garter snakes or their habitat during HDD and/or trench construction activities. If a frac-out were to occur in giant garter snake habitat, potential impacts could occur if drilling mud fills shelter burrows used by snakes and trapping them. To mitigate the potential impacts of a "frac out," a detailed Contingency Plan for HDD has been developed and is presented in Appendix C. Construction under and near the Cosumnes River will be scheduled during the dry months to minimize potential impacts to snakes.

2.1.1.7A Bald Eagle

The **bald eagle** (*Haliaeetus leucocephalus*) is a Federal threatened species and state endangered species. They nest near large bodies of water in California at low elevations and require a continuous supply of fish and/or waterbirds for prey. The bald eagle builds a large stick nest in old growth tree stands with 40 percent canopy cover near a permanent water source. They do not generally nest near human disturbance. The nearest record for nesting bald eagles was reported in 1992 approximately 5 miles east northeast of Rancho Seco. The bald eagle winters in the Central Valley of California.

Bald eagle population declines have been attributed to pesticide use and to a lesser extent, direct loss of individuals due to shooting, electrocution and traffic. Through recovery efforts implemented since its listing under the Endangered Species Act, the bald eagle population has increased in the lower 48 states (Federal Register 1999.) The USFWS proposed to delist the species in 1999.

Impacts to wintering bald eagle could result from disturbance to winter roosts or collisions with the electric transmission line or HRSG stacks. The CPP project will not contribute to the pesticide load in the region. There are no known communal winter roosts in the project area. Design of a 230-kV transmission line with conductor spans greater than 6 feet would minimize the potential for electrocution. The CPP project may affect, but will not adversely affect the bald eagle.

2.1.2A State Listed Terrestrial Species

2.1.2.1A Swainson's Hawk

The **Swainson's hawk** (*Buteo swainsoni*) is a California threatened species and nests in the Sacramento Valley from April through September. They migrate in September and October to winter in Central and South America where they forage in agricultural fields and return to their breeding grounds in the Central Valley in March and April. They nest in riparian areas close to open grasslands and agricultural crops that support prey. Swainson's hawks prey on large insects, small mammals, snakes, and other small reptiles and amphibians up to 10 miles from active nest sites (CDFG 1992).

Pesticide use in South America has contributed to the decline in Swainson's hawk populations when the birds feed on contaminated insects (Stockton Record, March 15, 1996). The Swainson's hawk is declining in California due to pesticide use on wintering grounds and loss of nesting and foraging habitat in the Central Valley.

Swainson's hawks are sensitive to disturbance during nesting and CDFG recommends a 0.5-mile buffer between construction and active nests. There are several known and potential nest sites from 2001 surveys conducted by CDFG within 0.5 mile of the proposed gas pipeline (Gifford 2002), but none near the project site (see Figures 5 through 9). Potentially suitable nest trees occur along the gas pipeline route in the Cosumnes Preserve. A Swainson's hawk could nest in any of these in any year. No Swainson's hawks were observed foraging on the project site during field surveys.

The proposed action will have no affect on the wintering grounds of the Swainson's hawk. However, the proposed CPP project may impact the Swainson's hawk through loss of foraging habitat (annual grassland on the CPP site) and potential disturbance to nest sites during the breeding season (March 1 through August 15) along the gas pipeline alignment. Noise from construction of the CPP project features may cause disturbance to nesting Swainson's hawks if active nest sites are within 0.5 mile of construction areas.

In general, construction of the pipeline will avoid the Swainson's hawk nesting season (March to August) whenever feasible. In locations where this is not practical, SMUD will consult with CDFG to develop site-specific mitigation measures to avoid and minimize potential adverse impacts, as described in Section 5.0A.

Impacts to Swainson's hawk could also occur from collisions with the electric transmission line or HRSG stack. Protection and mitigation measures for Swainson's hawk are presented in Section 5.0A. With implementation of these measures, the CPP project may affect but is not likely to adversely affect Swainson's hawk.

2.1.2.2A Greater Sandhill Crane

The **greater sandhill crane** (*Grus canadensis tabida*) is a California threatened and Fully-Protected species. It breeds in Siskiyou, Modoc, Lassen, Plumas, and Sierra counties during the summer, nesting in remote wetlands and shortgrass prairies. Sandhill cranes winter in the Cosumnes River Preserve from approximately September 15 to March 15 of each year. They occur in large flocks on the preserve, and fly out daily to surrounding farmland to feed. They were observed on the parcels east of the Cosumnes River proposed for the pipeline construction during early spring of 2002. They arrive at the Cosumnes in

September and October and return north in early spring. The CPP pipeline is within the sandhill crane migratory route and wintering area.

Greater sandhill crane populations have declined because of loss of nesting habitats, loss of winter forage habitats, and direct mortality due to collisions with man-made structures. Sandhill cranes are generally absent from the area where new transmission lines and the stacks would be, so the risk of collision is low.

Pipeline construction in the vicinity of waterways is generally planned for the dry months to avoid adverse impacts to water quality and to avoid the period when sandhill cranes are present in the area. However, to the extent there could be some overlap in construction activities, there would be no construction in the rice fields and the Cosumnes Preserve within 5 miles of Interstate 5 (which is the greatest concentration area) and from one day to the next, construction would proceed slowly south. Sandhill cranes would temporarily avoid the immediate vicinity of construction for a distance of approximately 0.25 miles, but would be able to use that area after construction has passed through. Sandhills are strong fliers and use the Central Valley as far south as Stockton and as far north as Sacramento. There is ample area for these birds to forage during construction, if both occur contemporaneously. No wintering forage habitat (rice fields and row crops) or nesting habitat will be lost for these species from the proposed action. The CPP project may affect, but is not likely to adversely affect greater sandhill crane.

2.1.1.3A American Peregrine Falcon

The **American peregrine falcon** (*Falco peregrinus anatum*) is a California endangered species. It was delisted as a Federal endangered species in 1999. It usually breeds in woodlands, forests and coastal habitats near wetlands, rivers, or lakes. They nest on protected cliffs and ledges for cover, and occasionally use tree cavities and tall buildings for nest sites. American peregrine falcon are not known to nest in the CPP area but may use the Central Valley as winter foraging habitat, feeding on small birds. The CPP project area and Cosumnes Preserve contains suitable winter foraging habitat.

Reasons for the decline of the peregrine falcon are pesticides, and loss of nesting and hunting (foraging) habitat. The proposed action will not contribute to the pesticide load in the region, no nesting habitat will be lost, and only temporary wetland losses (foraging habitat) will occur. Impacts to wintering American peregrine falcon could occur from collisions with the electric transmission line or heat recovery steam generator (HRSG) stack. The CPP project may affect, but is not likely to adversely affect peregrine falcon.

2.1.3A Non-Listed Terrestrial Species of Concern

2.1.3.1A California Hibiscus

The **California hibiscus** (*H. californicus*) or rose mallow (*Hibiscus lasiocarpus*) is a CNPS list 2 species. It is not currently a Federal or state listed species. California hibiscus is restricted to mesic, warm, low elevation sites, typically in riparian settings. California hibiscus is known to occur in the Cosumnes Preserve.

Reasons for decline of this species include development, agriculture, channelization of the rivers, and loss of wetlands (CNPS 1994, CDFG 1984). The natural gas pipeline route will avoid potential habitat for California hibiscus in riparian areas by using HDD.

Potential impacts to individual hibiscus plants could occur if a frac-out were to occur where this species is located. Drilling mud (bentonite) could temporarily cover plants. The hibiscus is a perennial and would most likely recover from the temporary impact in the next season. The CPP project may affect but is not likely to adversely affect California hibiscus.

2.1.3.2A Legenere

Legenere (*Legenere limosa*) is a CNPS list 1B species that occurs in southern Sacramento and northern San Joaquin valleys. It requires moist ground in vernal pools, lakes, ponds, and sloughs (Nakamura and Kierstead-Nelson 2001). Legenere is an herbaceous annual that blooms May to June after the pools are dry. Flowers are white to yellow. Legenere is threatened by grazing and loss of habitat from development.

Legenere occurs near the CPP pipeline construction corridor. A large vernal pool north of Arno Road and Highway 99 supports an abundance of this species (Marty 2002). In 2000, legenere covered 75 percent of the pool bottom.

The CPP project proposes to avoid the vernal pool at Arno Road by placing the pipeline on the south side of Arno Road. The CPP is not likely to adversely affect legenere.

2.1.3.3A California Tiger Salamander

The **California tiger salamander** (*Ambystoma californiense*) (CTS) is a federal Candidate species and California Species of Special Concern. CTS is known from the San Francisco Bay area, the San Joaquin Coast Ranges, the Central Valley from Yolo County south to Kern County, and the mountains and foothills of Santa Barbara and San Luis Obispo Counties, where it is found in annual grassland and oak woodland habitats (Zeiner 1988). They normally are not found in water bodies that support predatory fish species such as bass, catfish, and trout, as the fish will prey on CTS larvae. Other habitats include permanent ponds, slow moving streams, vernal pools, and other seasonal ponds that hold water for 4 to 6 consecutive months below 1,000 feet in elevation for breeding. Adults commonly use ground squirrel burrows or cracks during aestivation (summer dormancy). CTS can travel 0.5 mile or more from aestivation sites to breeding ponds. Migration to breeding ponds occurs following warm winter and spring rains from October through May (Jennings 1994). CTS that use permanent ponds containing predatory fish or frogs as breeding habitat will most likely be unsuccessful as the larvae get eaten (CDFG 1999). CTS may require two or more years to become sexually mature and can live for 25 years or more.

CNDDB records show historic occurrences of CTS along Twin Cities Road near Rancho Seco, and in Borden Ranch 1.25 miles south of Rancho Seco. CTS larvae were found in a constructed vernal pool approximately 0.25 mile east of Rancho Seco Reservoir in 2002 (Ellen Davis; Davis Environmental Consulting, personal communication). Dr. Mark R. Jennings (Rana Resources) conducted field surveys for CTS in the CPP project area in April 2002 but detected no CTS along the gas pipeline. Breeding habitat in these areas primarily consists of stock ponds, vernal pool, or other seasonal pools.

The CPP site does not contain suitable breeding habitat for CTS and none was found during field surveys (Jennings 2002). In general vernal pools along Arno Road, Twin cities and near the Cosumnes look potentially suitable. However, Jennings noted "the presence of abundant bullfrog populations …severely restricts the ability of these species to successfully reproduce and survive in the restricted aquatic habitats available. Jennings further observed "extensive habitat degradation along the proposed corridor route, due to established roads (where animals can be run over), man-made canals, vineyards, feed lots, residential landscaping and other agricultural activities. The railroad right-of-way in survey area 4 [near Twin Cities road] was disturbed several times by individuals during the month of April by driving ATVs and other vehicles through vernal pools on both sides of the railroad tracks as they dried. Thus any organisms present in these pools are already being negatively affected by human activities.

The CPP project will not result in the loss of CTS breeding habitat and is not likely to adversely affect California tiger salamander.

2.1.3.5A Western Pond Turtle

The **western pond turtle** (*Clemmys marmorata*) is a Federal Species of Concern and state Species of Special Concern. Western pond turtles require permanent or nearly permanent water, such as ponds, lakes, streams, or irrigation canals. Western pond turtles were observed in a perennial pond in the Cosumnes River Preserve immediately west of Highway 99 and in the concrete box culvert in Clay Creek 0.25 mile northwest of the CPP site access road. They could also occur in Badger, Clay, Hadselville, and Laguna creeks and the Cosumnes River. In addition, stock ponds in the vicinity could support this species.

Reasons for decline of these turtles include loss of dispersion corridors, wetlands, and shallow, slow moving aquatic habitats. Avoidance of the habitats during construction of the natural gas pipeline by directional drilling underneath the waterways or keeping trench work outside open water areas is expected to eliminate direct impacts to pond turtles. The CPP project may affect, but is not likely to adversely affect western pond turtles.

2.1.3.6A Western Burrowing Owl

The **Western burrowing owl** (*Athene cunicularia*) is considered a federal Species of Concern and a California Species of Special Concern. Burrowing owl habitat consists of open grassland or prairie with short vegetation and an abundance of mammal burrows. Burrowing owls prey on small mammals, insects, and crayfish, and can feed on carrion. Short vegetation may increase prey availability, enhance predator detection by the owls, and attract burrowing mammals that provide nest sites for burrowing owls. The species is typically migratory but may use burrows in the project area and along the pipeline both during the breeding season and winter.

Potentially suitable habitat occurs along the railroad tracks west of Franklin Boulevard, along Twin Cities Road, and at the project site. Burrowing owls tend to use the same burrows from year to year, such that the presence of burrowing owls usually indicates they will be back in following years. One owl pellet was reported adjacent to a burrow approximately 300 feet northwest of the proposed CPP site in 2001. No owls were observed on, or adjacent to, the project site during protocol surveys in May 1 and 3, 2002. Only one pair of owls was observed along the pipeline, located at Sims road in the Sacramento

Regional Wastewater Plant bufferlands. Owls could potentially colonize any suitable squirrel burrows in any year, but presently there is no evidence of any owls along the pipeline corridor with the exception of the pair at Sims Road. The CPP project is not likely to adversely affect western burrowing owls.

2.1.3.7A American Bittern

The **American bittern** (*Botaurus lentiginosus*) is a Federal Species of Concern. The American bittern is found throughout the Central Valley most times of the year in tall emergent marsh habitats. It builds nests on the ground from reeds and grasses in dense marsh areas. It feeds on a variety of species, including fish, snakes, amphibians, invertebrates, crayfish, insects, birds, and small mammals. American bittern are known to nest and forage in the Cosumnes Preserve, along irrigation canals, streams, ponds, and rivers in the project area. The water bodies with emergent wetland vegetation along the CPP pipeline area are suitable nesting habitat for the American bittern and the canals provide a variety of prey.

Reasons for decline of the American bittern include loss of emergent wetland habitats throughout California. Irrigation canals containing prey species and tall emergent vegetation found in agricultural fields are used as alternative habitat. Impacts to the American bittern from the CPP project include the potential for nest disturbance during construction near irrigation canals. Avoidance of the habitats during construction of the natural gas pipeline by directional drilling underneath the waterways or keeping trench work outside open water areas is expected to eliminate direct impacts to bittern. Preconstruction surveys will be conducted in the project disturbance areas for American bittern nest sites as well as other nesting species. The worker awareness training program will include instruction on avoidance of all nest sites in construction zones and notification procedures if nest sites are located.

2.1.3.8A Grasshopper Sparrow

The **Grasshopper sparrow** (*Ammodramus savannarum*) is a Federal Species of Concern. It builds nests of grasses and forbs on the ground at the base of tall, dense grass clumps in open grasslands. The distribution of grasshopper sparrows includes the eastern portion of Sacramento County in its summer, nesting range (Zeiner 1990a, Peterson 1990). The grasshopper sparrow occurs in Sacramento County as a winter migrant. The grasshopper sparrow is not known to nest in the project area.

Reasons for decline of grasshopper sparrow include loss of open grassland habitat from conversion to farming, houses, and other development. Impacts to nesting grasshopper sparrows are not anticipated from the CPP project; however, the worker awareness training program will include instruction on avoidance of all nest sites in construction zones. The CPP project is not likely to adversely affect the grasshopper sparrow.

2.1.3.9A White-Faced Ibis

The **White-faced ibis** (*Plegadis chihi*) is a Federal Species of Concern and California Species of Special Concern. It nests in small colonies in freshwater marshes, ponds and rivers in isolated areas in southern California, the Klamath basin, and the Central Valley. It feeds on crustaceans and other invertebrates in muddy emergent marshes and croplands. White-faced ibis are occasional visitors of the Cosumnes Preserve.

Reasons for decline of the white-faced ibis population include loss of wetlands used as nesting and forage habitats. Impacts to the white-faced ibis could occur from collisions with the electric transmission line or HRSG stack. The CPP project may affect, but is not likely to adversely affect white-faced ibis.

2.1.3.10A White-Tailed Kite

The **White-tailed kite** (*Elanus leucurus*) is a California Fully-Protected species. It is a year-round resident of the Central Valley, coastal range, and foothills. It is common in agricultural areas, feeding on small mammals, inspects, birds, reptiles, and amphibians. It nests in riparian and/or isolated tall trees and shrubs near foraging areas. White-tailed kites are known to nest in the Cosumnes Preserve and could nest in trees near the site and along the gas pipeline alignment.

Reasons for decline of the white-tailed kite include loss of riparian nesting habitats and open forage areas. Impacts to the white-tailed kite could occur from collisions with the electric transmission line or HRSG stack. With implementation of protection measures, the CPP project may affect, but is not likely to adversely affect white-tailed kite.

2.1.3.11A Special Concern Bats

Myotis Bats

The **Small-footed myotis bat** (*Myotis ciliolabrum*), long-eared myotis bat (*M. evotis*), fringed myotis bat (*M. thysanodes*), long-legged myotis bat (*M. volans*), and Yuma myotis bat are Federal and State Species of Concern. These bats roost in crevices, buildings, spaces under bark, and in caves in undisturbed areas (Zeiner, et al., 1990b). These species avoid the arid Central Valley, remaining in the foothills, feeding on insects and spiders over trees and water. Potential suitable habitat exists in the Cosumnes Preserve riparian corridor. The Cosumnes Preserve riparian corridor will be avoided with use of the HDD construction method for the gas pipeline. No impacts to these species of myotis bats are anticipated from CPP project activities as no potential roost structures or riparian trees will be affected.

Big-Eared Bats

The **Pacific western big-eared bat** (*Plecotus townsendii townsendii*) and Pale Townsend's big-eared bat (*Plecotus townsendii pallescens*) are Federal and State Species of Concern. They are found throughout California and require caves and buildings or other structures for roosting. They are extremely sensitive to disturbances at roost sites (Zeiner, et al., 1990b). Big-eared bats hibernate during cold weather, from October to April. They feed on flying insects by gleaning from foliage. Potential suitable habitat exists in the Cosumnes Preserve riparian corridor. The Cosumnes Preserve riparian corridor will be avoided with use of the HDD construction method for the gas pipeline. No impacts to bats are anticipated from CPP project activities as no potential roost structures or trees will be affected.

Greater Western Mastiff Bat

The **Western mastiff bat** (*Eumops perotis californicus*) is a federal Species of Concern and California Species of Special Concern. It prefers semi-arid to arid habitats, including annual and perennial grasslands. It roosts in crevices of rock outcrops and buildings (Zeiner, et al., 1990b). The western mastiff bat stays active all year long, going into daily torpor from December through February, and resuming feeding during the night. It forages up to 7 hours per night and does not retain night roosts like many bat species. Potential suitable

habitat exists in the Cosumnes Preserve riparian corridor. The Cosumnes Preserve riparian corridor will be avoided with use of the HDD construction method for the gas pipeline. No impacts to bats are anticipated from CPP project activities as no potential roost structures or trees will be affected.

Pale Townsend's big-eared bat

The **Pale Townsend's big-eared bat** is a Federal Species of Concern and California Species of Special Concern. This species requires caves, and buildings or other structures for roosting and is extremely sensitive to disturbances of roost sites (Zeiner 1990b). Suitable habitat exists in riparian areas in the Cosumnes Preserve area.

Reasons for decline of pale Townsend's big-eared bat include loss of breeding and roost habitat in areas with suitable habitat. No impacts to bats are anticipated from CPP project activities as no potential roost structures or trees will be affected.

2.2A Area of Disturbance—Terrestrial Species

Permanent and temporary surface disturbances were evaluated for the Central Valley habitats that could support special-status species. Table 2 presents the overall, total acreage of permanent and temporary surface disturbance used to evaluate mitigation requirements.

More specific assessment of areas of impacts by habitat types is provided for the gas supply pipeline in Table 3 and for the CPP site and laydown area in Table 4. The total acreage in survey area reflects values in the Final Wetland Delineation report for the project (CH2M HILL, 2003).

TABLE 2
Total Area in Acres of Temporary and Permanent Surface Disturbance During Construction and Operation of CPP

Feature	Size of Disturbance	Duration (if temporary)	Habitat Type	Temporary (acres)	Permanent (acres)
Project Site and Detention Basin	Polygon of CPP site and detention basin		Annual Grassland with open water, streams, seasonal marsh, swales, wetlands, and vernal pools	NA	30
Site Construction Laydown	Polygon	32 months	Annual Grassland with seasonal stream and swale, and vernal pools	20	0.62
Site Construction Access Road	0.5 mile x 24' wide permanent, additional 0.5 mile x 25' for construction	12 months	Annual grasslands and wetland swales	1.5	1.5
Gas Pipeline	Polygons for construction corridor over 26 miles (encompasses 26 miles x 35' permanent easement [(26 x 5280 x 35)/ 43560 = 110 acre easement])	22 month	Ruderal, roadside, agricultural, annual grassland, along with jurisdictional wetlands including marsh, seasonal swales, wetlands, vernal pools, ditches, and ponded features. HDD drilling beneath river, creek, and riparian woodland habitats.	212	0
Gas Valving Stations	Two sites 50 x 50, one site 100 x 100		Ruderal, roadside, annual grassland, agricultural		0.34
Gas Pipeline Gas Compressor Stations	Two sites of 150' x 150' contained in existing fenced/ disturbed areas.		Fenced gravel area at existing interconnection		0
230-kV Transmission Line	Corridor 0.4 mile suspended lines, 150' wide temporary construction corridor	8 weeks	Annual grassland with seasonal swales and creek and degraded vernal pools	7.3	
Transmission Tower Footprints	Six towers with 6' in diameter, permanent concrete footings.		Annual grassland		0.004
Water Supply	0.4 mile x 75' temporary construction width.	4 weeks	Annual grassland with seasonal swales and creek and degraded vernal pools	3.7	0
Water Pump Station	(existing)				0
Total				**244.5**	**32.46**

TABLE 3
Summary of Wetland Areas within the Temporary Natural Gas Pipeline Construction Area

Project Feature and Wetland Type	Total Acreage in Survey Area	Temporary Impact Area
Natural Gas Pipeline Alignment Total Survey Area: 679 acres		
Rivers and Creeks (Jurisdictional)	2.907	0.013
Riparian Woodlands (Jurisdictional)	2.542	0
Freshwater Marsh (Jurisdictional)	2.310	0.106
Vernal Pools (Jurisdictional)	0.625	0.029
Seasonal Swales (Jurisdictional)	0.588	0.185
Seasonal Wetland (Jurisdictional)	5.300	0.891
Drainage Ditches (Jurisdictional)	10.687	0.515
Ponded Features (Jurisdictional)	0.023	0.011
Seasonal Swales (Not jurisdictional)	0.213	0.013
Seasonal Wetland (Not jurisdictional)	0.565	0.401
Drainage Ditches (Not jurisdictional)	10.390	3.079
Ponded Features (Not jurisdictional)	0.782	0.457
Ponds (Not jurisdictional)	0.618	0.331
Subtotal Jurisdictional Wetlands	24.982	1.749
Total Non-jurisdictional Wetlands and Non-wetland Features	12.568	4.280

TABLE 4
Summary of Wetland Features for the Cosumnes Power Plant Project: Plant Site and Laydown Area

Project Feature and Wetland Type	Total Acreage in Survey Area	Temporary Impact Area	Permanent Impact Area
Laydown Site Survey Area: 49 Acres			
Vernal Pools (Jurisdictional)	0.375	0	0.055
Seasonal Swales (Jurisdictional)	0.908	0	0.431
Seasonal Stream (Jurisdictional)	0.350	0	0.132
Subtotal Jurisdictional Wetlands	1.633	0	0.618
Plant Site Total Survey Area (from DEC 1999, 2000):310 Acres			
Open Water (Jurisdictional)	0.723	0	0
Perennial Stream (Jurisdictional)	2.429	0	0.110
Placer Tailings (Jurisdictional)	4.832	0	0
Seasonal Marsh (Jurisdictional)	0.751	0.285	0
Seasonal Stream (Jurisdictional)	1.724	0.114	0.135
Seasonal Swales (Jurisdictional)	4.882	0.024	0
Seasonal Wetland (Jurisdictional)	4.197	0.255	0.900
Vernal Pools (Jurisdictional)	0.925	0.033	0.027
Subtotal Jurisdictional Wetlands	20.463	0.711	1.172

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3.0A Cumulative Effects-Terrestrial Species

Some impacts associated with the CPP, which when considered in conjunction with impacts attributable to other projects (either in the vicinity or with similar characteristics), could have the potential to result in collectively adverse effects to the environment that are of greater significance than the individual impacts of the CPP project.

For purposes of this Biological Assessment, cumulative effects we use the definition at 50 CFR 402.02. That is, "…those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur in the action area of the Federal action subject to consultation."

3.1A Projects Considered as part of Cumulative Effects

Non-Federal projects identified in the vicinity of the proposed action include:

- An application for biosolids storage on 3 parcels on the north side of Twin Cities Road (06/11/97), adjacent to and east of Clay Station Road. Mr. Gary Silva stores and applies biosolids to cattle pastures in this area.

Non-Federal projects identified in the vicinity of the proposed pipeline action include:

- An application to create two lots on the Buzdas property (9/25/00).
- An application to create a residential accessory dwelling (8/30/00).
- An application to create a residential accessory dwelling (Leonard no date).
- An application for Lakepoint Apartments –pending (no date)
- An application to rezone Park to "O" (1/27/99).
- An application from JDS Laguna Sub. Extension of Time (9/21/01).
- An application for RV and Boat storage use permit (12/31/97).
- An application for Harris ranch #1 – now City of Elk Grove recorded 4/4/2000.
- Improvement plans for Franklin Boulevard—Poppy Ridge to Elk Grove Boulevard, including Future Laguna Estates, Elk Grove Greens, Jungkeit Dairy, and Franklin Meadows—filed with City of Elk Grove June 2002

3.2A Cumulative Effects of All Projects

With the exception of the biosolids storage, all these projects cover a small area (one lot to 10 acres) and would not cause loss of habitat for any animals at the project site or pipeline.

Biosolids applications north of Twin Cities Road would not cause any change in land use or habitat.

The CPP project is not anticipated to result in significant impacts related to biological resources. However, the CPP project would convert annual grassland habitat on the site to industrial development. This is the general trend in the Central Valley, and it incrementally reduces the value of habitat available to native wildlife species including migratory bird species.

The CPP project would also temporarily disturb habitat associated with construction of the linear CPP project components. This disturbance would result in the temporary reduction of habitat quality. Temporary activities could result in incidental death of wildlife and the disruption or failure of breeding efforts. Construction limits, environmental awareness training, biological monitoring, habitat compensation, and habitat restoration would mitigate temporary disturbances.

The project has the potential to increase slightly the risk for bird collisions with new electric transmission lines and towers in the Sacramento County portion of the Central Valley.

4.0A Direct and Indirect Effects of the Proposed Action-Terrestrial Species

Impacts to the species under discussion can be short-term (one or two reproductive seasons), or long-term (affecting several generations). They can be direct (an immediate affect to an individual, population or its habitat), or indirect (an affect that may occur over time or result from other actions).

4.1A Effects to Federal Listed Species

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Construction of the project site would permanently fill habitat or potential habitat for fairy shrimp and vernal pool tadpole shrimp. Primary constituent elements (PCEs) affected would be 1) vernal pools or ephemeral wetlands of appropriate size and depth and 2) the geographic, topographic and edaphic features that support vernal pool complexes. The project would directly and permanently fill vernal pools and seasonal wetlands that support fairy shrimp as listed in Table 5.

TABLE 5
Acreage of Potential Fairy Shrimp Habitat Types Directly and Indirectly affected by the Cosumnes Power Plant Project. And Summary of Areas Within Critical Habitat Units

Habitat Type	Direct (Acres)	Direct within Critical Habitat (Acres)	Indirect (Acres)	Indirect within Critical Habitat (Acres)
Vernal Pool	0.138	0.109	2.101	0.526
Created Vernal Pool	0	0	1.253	0
Swale	0.819	0.533	0.835	0.004
Seasonal Stream / Pool	0.033	0.033	0	0
Degraded Seasonal Wetland	0	0	1.805	1.805
Seasonal Wetlands	1.242	0.747	0.748	0.013
Drainage Ditches	0.076	0.076	0	0
Ponded Features	0.659	0.498	0.135	0.054
Total for all habitat types	**2.967**	**1.996**	**6.877**	**2.402**

Details supporting this table are provided under separate cover: ***Vernal Pool Invertebrate Habitat Assessment for the Cosumnes Power Plant and Associated Linear Features. Technical Memorandum from Russ Huddleston to EJ Koford, CH2M HILL. January 17, 2003.***

Indirect impacts to fairy shrimp habitat, defined according to the USFWS (1997) as changes in hydrology within 250 feet of project construction (including project site, laydown area, water supply line, transmission towers, stormwater detention basin and access road), total 2.31 acres. (See Appendix B for a more complete discussion of how indirect impacts are quantified).

Pipeline construction would temporarily directly disturb 1.66 acres of vernal pools, degraded vernal pools, constructed vernal pools, railroad and roadside pools and non-jurisdictional pools that would be habitat for fairy shrimp. Trenching through vernal pools and similar fairy shrimp habitat would be a direct adverse affect on the fairy shrimp species. Indirect impacts to fairy shrimp habitat from pipeline construction, defined according to the USFWS (1997) as changes in hydrology within 250 feet of project construction are estimated at 4.57 acres. With additional field verifications, this area may be adjusted down slightly, but is the best current estimate.

The project site and pipeline were designed to avoid, to the extent feasible potential habitat for fairy shrimp and the relatively low area indicated here shows that the applicant was relatively successful at doing so. Previous studies for the SMUD Cogeneration Pipeline Project indicated that after gas pipeline construction, both vernal pool fairy shrimp and vernal pool tadpole shrimp had re-established themselves in 90 percent of pools in the right-of-way (Correspondence from SMUD to Wayne White May 30, 1997; ENV 97-168). Based on this information, it is reasonable to expect that most of the fairy shrimp habitat temporarily disturbed by construction will re-establish after construction. SMUD will compensate through preservation, restoration and construction for residual impacts as described in Section 5.0A below. The proposed action is likely to affect, but would not adversely affect continued existence of vernal pool fairy shrimp and vernal pool tadpole shrimp.

Valley Elderberry Longhorn Beetle

There are no elderberry bushes on or near the project site. There are ten elderberry bushes along the pipeline construction corridor exclusive of any that occur within the Cosumnes River riparian corridor. Elderberry shrubs along the corridor would be flagged and avoided to prevent any adverse impact to valley elderberry longhorn beetles, if they occur there. The Cosumnes River riparian corridor will be avoided by using HDD methods. Therefore any elderberry shrubs that occur in the Cosumnes River riparian zone would be avoided unless there is an HDD "frac-out." In the event of a "frac-out" the contingency plan included in Appendix C would be implemented to minimize and remediate for any adverse impact. Without the elderberry shrubs present in the project area, and by avoiding elderberry shrubs along the pipeline construction corridor, the beetle would not be directly or indirectly affected.

Giant Garter Snake

The USFWS November 13, 1997, *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Project with Relatively Small Effects on the Giant Garter Snake* identifies three levels of impacts, or effects to snake habitat based upon the amount, nature, and duration of potential effects. Level 1 effects are temporary, restored within the same construction season as occurrence, and do not exceed 20 acres. Level 2 effects are temporary, affect less than 20 acres, and are restored within two snake construction seasons. Level 3 effects result from the permanent or significant loss (at least 3 years to restore) of less than 3 acres of habitat. If any of the criteria for a given effect level are exceeded, then the effects may be considered equivalent to the next highest level. For the current project, all pipeline construction is considered to be a temporary impact, that would last for duration of 1 to 16 weeks before filling the trench and restoring topography and vegetation. Once in place, the pipeline would be below ground and have no surface effect.

The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of (1) adequate water during the snake's active period (i.e., early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters (USFWS 1997). The USFWS defines a disturbance areas for giant garter snake that may exceed project boundaries because a 200-foot radius (61 meters) from the edge of giant garter snake aquatic habitat is incorporated to include essential habitat components and determine potential take. Disturbance may be temporary and/or permanent and should consider: (1) opportunities to avoid habitat within the project area; (2) area of dewatering and period of time dewatered; and (3) temporary haul roads and equipment staging areas. The 200-foot buffer (61 meters) is also used to evaluate aquatic habitat disturbance during temporary alterations, i.e. upstream and downstream from berms placed for temporary dewatering.

USFWS defines temporary impacts as project activities which temporarily remove essential habitat components, but can be restored to preproject conditions of equal or greater habitat values. Projects, which are to be considered temporary impacts, must be able to implement the project and restore the affected habitat within two seasons (a season is May 1 to October 1).

There are no recorded records or suitable habitat for the giant garter snake on or near the project site (Clay east road and Rancho Seco) and therefore no adverse effects are expected from this portion of the project. The CNDDB records GGS localities near Arno Road and Badger Creek (about 1.5 mile north of the pipeline), just south of Arno Road near Highway 99 (1500 feet south of pipeline), west of Southern Pacific in Badger Creek/Horseshoe lake (800 feet SW of pipeline), and Franklin Blvd about 1 mile north of Core Rd (900 feet west of pipeline).

According to the USFWS any irrigation ditch or canal that contained water between May and November in this area was to be considered aquatic habitat. The USFWS based its determination that suitable snake habitat west of the Folsom South Canal may be inhabited by snakes upon: (1) knowledge of the species' range and distribution; (2) presence of habitat within the proposed project's action area; (3) the movement capabilities of the snake; and (4) known snake locality records. Any areas within 200 feet of the aquatic feature that were not covered by paved roads, row crops, vineyards, urban development or entirely void of vegetation were to be considered upland foraging habitat for giant garter snake. Based on the habitat mapping and field surveys, a 200 foot buffer was drawn on either side of the pipeline construction corridor (65 feet wide), and any potential GGS habitat that comprised adequate water and vegetation was mapped using orthogonal photography and measured using GIS. The result was a combined area of 41 acres of disturbance area, of which 0.6 acres is aquatic and 40.3 upland habitat. There would be no permanent impacts to GGS habitat.

Trenching for the gas pipeline in the vicinity of the Cosumnes and Badger Creeks could potentially disturb or injure giant garter snakes during construction. Implementation of avoidance and mitigation measures specified in Section 5.1A and 5.8A would reduce those impacts. Impacts would result only during construction and would be temporary. The

proposed action is likely to adversely affect giant garter snakes. Mitigation measures would reduce those impacts such that the giant garter snake would not be adversely affected.

Bald Eagle

Bald eagles may occasionally forage in the project area, and are known winter migrants in the area. There are no records of nests 1 mile of the project or pipeline. Bald eagles could be injured or killed by collision with transmission lines or HRSG towers of the project. Designing transmission lines to APLIC standards for "raptor-proofing" would reduce impacts. The proposed action would not adversely affect bald eagles.

4.2A Federal Candidate and Special Concern Terrestrial Species

Legenere

Legenere is not known from the project site or vicinity. A large population is known from a vernal pool complex north of Arno Road, east of Highway 99. The construction corridor was revised during scoping to be on the south side of Arno road specifically to avoid this sensitive area. With the construction corridor on the south side of Arno road, the proposed action would cause no adverse impacts to legenere.

California Linderiella

California Linderiella is not known to occur on the project site, but is likely to occur in the vicinity and in any fresh water habitats (vernal pools, seasonal swales, railroad ditches) suitable to support fairy shrimp. As noted above, the project site and pipeline corridor have been selected to minimize potential impacts to these aquatic species and the construction corridor was revised during scoping to be on the south side of Arno road specifically to avoid sensitive area for this and other vernal pool species. With the mitigation and compensation measures specified in Section 5.0A for vernal pool fairy shrimp and vernal pool tadpole shrimp, the proposed action would affect, but would not adversely affect California linderiella.

Western Pond Turtle

Western pond turtle occur in the perennial portion of Clay Creek north of the project site, and seasonally move into other ponds and water in the area. Western pond turtle also occur in and near the fish ponds along Arno Road, in the Cosumnes River, Badger Creek and Laguna Creek along the pipeline. Construction in or close to these waterways would potentially crush or kill western pond turtles. Except for egg laying, turtles tend to remain in perennial water. Construction near water is proposed to occur during the dry season to avoid potential adverse impacts to water quality and animals that depend on water quality, including turtles. The careful siting of the project site and pipeline avoiding most aquatic features, the use of HDD to cross under the Cosumnes River and Badger Creek, environmental awareness training and monitoring would reduce impacts to western pond turtles. The proposed project may affect, but is unlikely to adversely affect western pond turtle.

Western burrowing owl

Habitat on the project site and along the pipeline corridor appears suitable to support foraging uses by western burrowing owl. Surveys during 2002 did not detect any nests on the project site. One pair of owls was observed near the pipeline construction corridor at Sims Road, in the Sacramento Regional Wastewater Plant Bufferlands.

Tricolored Blackbird

Tricolored blackbirds are known to forage on the project site south of Rancho Seco, although the nesting location appears to be somewhere over the hills south of the project. There are no known nesting sites on the project site or in 0.2 miles of the proposed pipeline. The proposed project would reduce incrementally the available foraging habitat for this species of concern. Through consultations with CDFG and field surveys, the project will avoid modifying any tricolor blackbird nesting habitat. The proposed project would affect, but is not likely to adversely affect tricolored blackbird.

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5.0A Mitigation and Protection Measures

Impacts to special-status plants and wildlife from construction and operation of the CPP project include direct but temporary habitat disturbance, permanent habitat loss, and potential nest disturbance. Mitigation measures were developed through informal consultation with the USFWS, CDFG, and USACE. The following sections present protection measures found to be effective in avoiding and minimizing impacts to special-status species, construction timing restrictions, and habitat compensation for permanent loss of habitats.

A summary of the mitigation measures for the CPP project is presented in Table 6. Additional detailed mitigation measures are presented in the following sections for each special-status species affected by the CPP project.

TABLE 6
Summary of Mitigation Measures for Impacts to Sensitive Biological Resources In the CPP Project Area

Biological Resource	Mitigation Measures
Habitats	**Minimize impacts through:**
Annual grassland	Habitat restoration:
Crop land	Long-term monitoring
Wetlands	Recontour topography of potential fairy shrimp habitats.
Plants	**Avoid and minimize impacts through**:
California hibiscus	Proper siting
	Salvage and transplant if in construction zone
Wildlife	**Protection and Mitigation Measures:**
Tadpole shrimp, fairy shrimp	Worker Environmental Awareness Training
Valley elderberry longhorn beetle	
Tiger salamander	Avoid habitat where practical
Giant garter snake	Off-site habitat compensation for temporary and permanent impact
Swainson's hawk	Preconstruction surveys, fencing and avoidance
Sandhill crane	Construct during dry season, HDD and stormwater BMPs
Burrowing owl	Preconstruction surveys, silt fencing, seasonal constraints
Western Pond turtle	Pre-construction consultation with CDFG, survey and monitor if <0.5 mile
Nesting and migratory birds	Construct HDD under waterways from July through September
	Nest avoidance and tree removal from October to February
	Constrain construction schedule appropriately
	Salvage and relocate individual wildlife
	Slope trenches to allow wildlife to escape

5.1A General Protection and Mitigation Measures of the CPP Project for Terrestrial Species

Many of the potential impacts to biological resources would be avoided through implementation of general conditions that guide good work practices. The following

measures would be implemented for all project impact areas. These measures would help to avoid and minimize incidental mortality and injury to plants and wildlife. The CPP project would:

1. Prepare a Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP) that outlines how the protection and mitigation measures will be implemented. The BRMIMP is a document required by the CEC that also describes the responsibilities of the Compliance Manager who oversees all compliance measures required for the project, the Designated Biologist who will oversee compliance with biological mitigation measures, and the Biological Monitor who oversees construction activities on the ground. The Designated Biologist submits daily logs and monthly compliance reports to the CEC. Any necessary monitoring reports are submitted to the CEC and relevant agencies.

2. Provide worker environmental awareness training for all construction personnel that identifies sensitive biological resources that may occur in construction areas and that addresses measures required to minimize project impacts during construction and operation.

3. Implement preconstruction surveys and resource relocation, if necessary, for sensitive species in impact areas prior to beginning ground-disturbing activities. Biological monitors would be present onsite during all construction activities in sensitive habitat to identify sensitive resources and provide relocation as necessary.

4. Avoid and minimize impacts to sensitive habitats and species during construction by designating exclusion zones with fencing and/or signage that restricts disturbance to minimal area.

5. Provide mitigation construction monitoring by qualified biologists during construction activities near sensitive habitats and resources and prohibit ground disturbance until area is cleared by the biological monitor.

6. Require that construction activities be limited to existing roads, access points, and construction zones developed in coordination with qualified biologists as specified in final approved construction plans and documents. Prohibit ground disturbance until cleared by the biological monitor. Where possible along linear pipeline alignments, use the alignment itself as the access route. Prohibit access to construction zones from off-road routes. Prohibit off-road traffic outside designated project areas.

7. Allow only permitted, authorized vehicles that have been inspected to ensure fire safety requirements on the construction sites; equip vehicles with catalytic converters with shielding or other acceptable fire prevention features.

8. Prohibit camping, firearms, trash-burning fires, warming fires, or pets in the construction zone at any time.

9. Monitor construction sites daily to pick up trash and litter. Place all food-related trash and litter in closed containers and dispose of daily.

10. Prohibit refueling or storage of hazardous materials within 200 feet of flagged sensitive plant species or sensitive wildlife habitat features (den, burrows, etc.), and within

100 feet of "waters of the U.S." or waters of the state. For portable equipment that use fuels or lubricants, use Visqueen or other containment material under the equipment to capture leaks or spills.

11. Prohibit intentional killing or collection of either plants or wildlife at construction sites.

12. Prepare construction monitoring and compliance reports that analyze the effectiveness of the mitigation measures.

13. Open trench work requires special attention in sensitive wildlife areas. A qualified biologist would be present during construction activities in suitable sensitive species habitat areas for the purpose of clearing, removing, salvaging, or excluding additional individuals from the construction area. To minimize mortality in pipeline trenches, egress ramps will be constructed at either end of the open trench to allow wildlife escape routes. Where feasible, open trenches would be covered at the end of each construction day; where this is not feasible because extensive or wide open trenches are exposed, open trenches would be surveyed prior to the start of construction each morning by qualified biologists for the purpose of capturing and removing any trapped wildlife.

5.2A Timing Restrictions During Construction

The following timing restrictions and acceptable work windows for construction in sensitive areas (see Table 7) were developed by the natural resource agencies to avoid and minimize impacts to special-status species. Note that some areas of the project will be required to postpone activities until the appropriate times. In addition, there could be small work windows where two or more species have overlapping windows.

TABLE 7
Established Work Windows for Special-Status Species in the CPP Project Area

Species name	Possible Location (mile post)	Active Period	Preferred Biological Construction Window
Vernal pool crustaceans	At CPP site and along gas pipeline	November to April	May through October
Valley elderberry longhorn beetle	Along UPRR and Cosumnes River	Spring to Fall	January through December
California tiger salamander	Farm ponds in south county area that persist for more than 12 weeks.	April to October	November through March in known locations
Giant garter snake	Cosumnes River and Preserve, Badger and Laguna Creeks	May to October	May 1 through October 1
Western pond turtle	UPRR and Franklin Rd crossing	April to October	November to March
Swainson's hawk	Areas with nest trees and Cosumnes Preserve	March 1 to August 15	August to February near active nest sites
Burrowing owl	Any potential nest burrows	March to August	September to February near active nest sites

5.3A Habitat Compensation

Habitat compensation will be required for the following species:

- Vernal pool fairy shrimp and tadpole shrimp
- Giant garter snake
- Swainson's hawk

Based on an evaluation of the opportunities and constraints of mitigation, SMUD proposes to implement one or more of the following measures to compensate for permanent and temporary loss of wetlands and habitat for special-status species from construction of the CPP facility.

- Acquire, preserve, create and restore, in perpetuity, vernal pool habitat according to the area shown in Table 9, for special-status species.
- Provide an endowment fund for the third-party costs of management and monitoring of the preserved habitats in perpetuity.
- Provide the title to preserved lands to the Sacramento Trust for Open Lands, or similar third-party organization to hold and manage the trust and endowment fund in perpetuity.
- Provide funding to the USFWS Species Account equivalent to 41 acres of giant garter snake habitat or purchase 41 snake credits in an approved GGS mitigation bank or acquire and manage a GGS mitigation area upon approval of USFWS.
- Provide equivalent of 30 acres of habitat for Swainsons' hawk foraging congruent with areas managed for vernal pools, and subject to the Sacramento Trust for Open Lands or equivalent third-party organization as described above.

5.4A Mitigation for Impacts to Waters of the U.S.

Construction in the bed or banks of any stream or riparian habitat would potentially cause increases in erosion, contamination, hydrologic changes, or vegetation removal that would reduce the ecological and functional values of the stream or wash. In addition to the general mitigation measures to protect biological resources, the following specific measures would be taken to minimize impacts to "waters of the U.S." and/or state waters.

For any location where project construction would fill jurisdictional waters, or occur in the "bed and banks" of streams, the applicant would obtain and comply with the applicable conditions of permits issued from the USACE (Section 404, Clean Water Act) and the CDFG (Streambed Alteration Agreement, Section 1601 as applicable). The terms and conditions of these permits may require payment of in-lieu fees to be used towards the purchase or restoration of "waters of the U.S.," including wetlands, in the regional vicinity of the CPP project. The final mitigation requirements for impacts to jurisdictional waters would be determined through continuing consultation with USACE, USFWS, and CDFG. Implementation of the conditions associated with these permits would be sufficient to protect the biological resources or mitigate for loss of biological resources at these locations. The application provided to the USACE would provide sufficient analysis of alternatives to

identify the least environmentally damaging practicable alternative, as specified under Section 404(b)(1) guidelines.

5.5A Mitigation for Vernal Pool Plants and Invertebrates

The grassy plateau east of Rancho Seco supports many vernal pools in a nearly natural state. Between the project site and Rancho Seco, there is a complex of degraded swales that have some vernal pool characteristics that are crossed by existing power lines and underground pipelines, and may support vernal pool fauna. New transmission lines and water supply lines for the CPP project would also cross through this area. This particular complex of vernal pools is at a lower elevation than those east of the reservoir, and appear to support sparse vegetation and turbid water indicating a degraded condition.

The swale north of CPP site contains vernal pool tadpole shrimp that could be directly affected. Because the species is readily transferred among pools in close proximity, any vernal pools and 250-foot buffer areas around the pools in the project vicinity are considered by the USFWS as potential habitat.

The gas pipeline alignment crosses many railroad-berm ponded areas in the vicinity of Franklin Boulevard, Twin Cities Road, and elsewhere that have hydrology similar to vernal pools, and vernal pool plants and invertebrates may be present. The gas pipeline was realigned to avoid a large vernal pool complex in the Cosumnes Preserve at Arno Road.

For guidance on appropriate and consistent mitigation, the USFWS has a programmatic opinion (1-1-96-F-1) for projects in conjunction with 404 permits. The general guidance of that document addresses direct and indirect impacts to fairy shrimp habitat. This project is not expected to be appended to the programmatic opinion, but the guidance is useful for determining potential mitigation consistent with other projects.

USFWS guidance (USFWS 1996) directs the mitigation ratios shown in Table 8:

TABLE 8
USFWS Mitigation Ratios for Fairy Shrimp

	Bank	Non-bank
Preservation (for direct or indirect impacts)	2:1	3:1
Creation (for direct impacts only)	1:1	2:1

The guidance indicates mitigation ratios for non-bank mitigation may be adjusted to approach those for banks if the [USFWS] considers the conservation value of the non-bank mitigation area to approach that of [USFWS]-approved mitigation banks.

The USFWS guidance of 1996 did not address temporary impacts, potentially because at the time there were no data on recovery of temporarily disturbed vernal pools. In 1997, SMUD submitted monitoring data on the Cogeneration Natural Gas Pipeline and Procter and Gamble Cogeneration Projects that showed 91 percent recovery of fairy shrimp after pipeline construction. Based in part on those data, and a confirmation of the actual disturbance during construction, the USFWS issued an amendment to the Formal Section 7 consultation reducing

the mitigation from an approximately 200-acre mitigation bank on Rancho Seco, to a 9.65-acre site. The mitigation site and a buffer around the site were set aside by recording a conservation easement on the mitigation site and buffer. The mitigation site supports a population of Sacramento Orcutt grass, as well as listed crustaceans. Based on the evidence that >90 percent of pools recover from temporary disturbance from pipeline construction, we believe a lower preservation ratio for temporary impacts is appropriate. The referenced pipeline was 25 miles long with approximately 26 miles of lateral lines, and was compensated with 9.65 acres of preserved habitat.

With respect to vernal pool mitigation, there is a particular opportunity in this project to benefit and enhance regional resources for fairy shrimp and other vernal pool organisms. As described previously, there are 3 degraded seasonal wetlands (DSW 1, 2, and 3) located approximately 0.2 mile north of the project site near Rancho Seco Plant. These pools would not be directly affected by any project construction. These pools were evidently excavated during construction of Rancho Seco, and were used to recapture concrete washwater. When active the pools were lined with plastic, and the washwater may have contained TSP, EDTA, or mild acid. Tadpole shrimp have been observed in DSW 2, but vegetation is depauperate and there are scraps of plastic and trash that degrade the quality of this habitat. SMUD proposes that restoration of these pools, totaling 1.80 acres should be a component of wetland mitigation for this project.

Based on wetland surveys, aerial photograph review, and a concerted effort to avoid through siting and alternative construction, SMUD has quantified the area of potential impact (see Table 9) and recommends the following mitigation measures:

1. Design the project and pipeline corridor to avoid to the extent practical all vernal pools, man-made ditches and railroad ditches that could potentially support vernal pool invertebrates.

2. In the vicinity of vernal pools, minimize construction corridor width to avoid to the extent practical disturbing vernal pools.

3. Conduct preconstruction habitat assessments within the project construction zones to identify and quantify areas where vernal pool species could occur.

4. Identify and report observations of vernal pool invertebrates during the course of surveys for other species.

5. Implement stormwater pollution prevention plan to reduce the potential for contaminants to enter waters or depressions where vernal pool invertebrates may occur.

6. After construction, restore the surface topography to pre-construction shape. This method has been shown to be effective in restoring at least 90 percent of vernal pool invertebrate habitat.

TABLE 9
Site and Amount of Proposed Project Effects to Listed Invertebrates and Associated Compensation

Location	Affected Area (acre)	Permanent, Direct or Indirect	"Bank" Compensation Ratio #:# Preservation (P) #.# Creation (C)	"Non Bank" Ratio #:# Preservation (P) #.# Creation (C)	Total "Bank" Compensation Area (Acres)	Total "Non Bank" Compensation Area (Acres)
Project Site, transmission line, water line, access road and laydown area.	1.310	Direct, Permanent	2:1 P 1:1 C	3:1 P 2:1 C	2.6 P 1.3 C	3.9 P 2.6 C
Project Site, transmission line, water line, access road and laydown area.	2.306	Indirect	2:1 P	3:1	4.6 P	6.9 P
Pipeline Direct	1.657	Direct	2:1 P 1:1 C	. 3:1 P 2:1 C	3.3 P 1.7 C	4.9 P 3.3 C
Pipeline Indirect	4.571	Indirect	2:1 P	3:1 P	9.1 P	13.7 P
Total Impact Area					**19.7 P 3.0 C**	**29.5 P 5.9 C**

Proposed Mitigation for Potential Impact to Fairy Shrimp, presuming Non-Bank Ratios.

	Preservation Acres	Creation Acres
Restore Degraded Swales South of Rancho Seco	NA	1.8
Rancho Seco Mitigation Area	10.6	4.1
Off-site Credits (Wildlands or Equivalent)	18.9	0
Total Compensation	29.5	5.9

7. In order to compensate for impacts of the proposed project on vernal pool species, SMUD proposes to provide compensation by one or a combination of the following methods:

   a) Prior to construction, purchase off-site mitigation credits in a USFWS-approved mitigation bank. Calculating from the anticipated impacts provided in Table 9 above, SMUD will purchase 19.7 preservation acre credits and 3.0 creation acre credits at an approved mitigation bank. The number of acres required to be purchased is based upon mitigation bank ratios of 2 preserved acres to 1 disturbed acre (2:1) plus 1 created acre to 1 disturbed acre (1:1) for direct impacts and 2 preserved acres to 1 disturbed acre (2:1) for indirect impacts (See Appendix B).

   b) Protect and manage in perpetuity with a conservation easement and perpetual endowment vernal pool habitat at SMUD's conservation area known as Rancho Seco Mitigation Area, nearby SMUD owned property and the restoration area north of the proposed project site ("SMUD Owned Mitigation Areas"). To the extent insufficient acreage is available at the SMUD Owned Mitigation Areas, SMUD will supplement SMUD owned property with the purchase off-site mitigation credits in a USFWS-approved mitigation area or mitigation bank. Given the proposed project effects provided in Table 9 above and discussions with the Service regarding the available acreage in the SMUD Owned Mitigation Areas, SMUD will provide mitigation as follows.

      1. SMUD will provide approximately 10.6 preserved acres within nearby SMUD owned property. (Mitigation provided at non-bank ratio of 3:1, preservation acres for each impacted acre.)

      2. SMUD will provide 4.1 restored acres within the Rancho Seco Mitigation Area and 1.8 restored acres north of the proposed project site. (Mitigation provided at non-bank ratio of 2:1, creation/restoration acres for each directly impacted acre.)

      3. SMUD will purchase 18.9 non-bank preservation acre credits off-site at a service-approved location or prior to construction SMUD will purchase 12.6 preservation acre credits at a Service-approved mitigation bank.

      SMUD will perform restoration, initial monitoring and development of the agency-approved management plan for SMUD Owned Mitigation Areas in accordance with the Biological Opinion and the Service approved plans for the initial five-year period. Once these phases are complete, SMUD will record a conservation easement over all non-bank areas. At that time SMUD believes that the Sacramento Valley Open Space Conservancy would be willing to accept and hold a conservation easement over these lands.

5.6A California Tiger Salamander

Surveys for California tiger salamander on the project site and along the gas pipeline construction corridor detected no tiger salamanders, and an abundance of bullfrogs,

crayfish, bass and other salamander predators. Although there are known records of salamanders in ponds east of Rancho Seco (approximately 1 mile east of the project site), it appears that their presence on the site and along the pipeline is unlikely. Measures already noted above to avoid and minimize impacts to aquatic habitats will have additional benefits for any tiger salamanders that may be in the project area.

5.7A Protection for Western Pond Turtle

Appropriate breeding habitat for western pond turtle is present along the waterways of Clay Creek, Laguna Creek, Badger Creek and the Cosumnes River. Underground burrows on the gas pipeline alignment could provide upland aestivation and shelter habitat and possible nesting habitat for turtles. The USFWS, CDFG, and the CEC were consulted for appropriate measures that would minimize impacts to listed species. Protection measures were developed for CPP to prevent sediments and construction debris from entering waterways as described in the erosion control and restoration plan. The mitigation and protection measures proposed for the project to avoid impacts to special-status salamanders and turtles include:

1. Conduct preconstruction habitat assessments within the project construction zones to locate areas where turtles could occur.
2. Find and relocate individual animals prior to ground disturbance activities
3. Set up construction zone limits at the creek banks, using silt fencing to restrict access by salamanders and turtles into construction areas.
4. Relocate any turtle, or other wildlife to safe areas outside the construction zone limits
5. Provide a qualified Biological Monitor during construction within potential western pond turtle habitats
6. Monitor stormwater discharge from the site for water quality parameters identified in the NPDES permit that protect beneficial uses

5.8A Protection Measures for Giant Garter Snake

Appropriate aquatic habitat for giant garter snake (GGS) comprises dense cattail or bulrush cover, with downed woody debris and partial shading to provide thermal cover. Wetland habitats on the project site do not have permanent water and dense cover that would support fish or highly aquatic species such as the giant garter snake; however, it is recorded from Badger Creek, near the Cosumnes River confluence and from a drainage canal near Franklin and Eschinger Roads, and could occur in connected waterways that support appropriate habitat. The gas pipeline crosses or passes close to wetland and marsh habitats ranging from completely aquatic sites (Cosumnes River, Badger Creek, Laguna Creek), cattail and bulrush marsh (Cosumnes River), farm ponds (Arno Road, Valensin Road), roadside ditches and swales (near town of Franklin), and vernal pools. Some of these lack the hydrology or vegetation to support GGS.

Giant garter snakes are actively foraging in warm months from May 1 through October 1 and typically hibernate in underground burrows (hibernacula) from October through April

and are highly susceptible to earth moving equipment during this time. Impacts to giant garter snakes can occur from the excavation of streams and/or irrigation canals and hibernacula during hibernation periods.

The USFWS has a Programmatic Agreement for impacts to GGS that defines impacts as level 1, 2 or 3, based on whether there are permanent impacts, and the area of temporary impacts. Mitigation measures proposed here are consistent with those allowed under the programmatic agreement (1997).

Level 1 project impacts result in minimal environmental effects, such as repair, rehabilitation, or replacement of previously authorized structures, survey activities, temporary recreational structures, utility lines installation by boring underneath irrigation canals or creek channels, and temporary cofferdams. Level 1 projects include those routinely authorized under Nationwide Permit number 12 (Installation of Utility Lines), and 33 (temporary construction, access and dewatering). The work must not result in any permanent loss of habitat and the temporary disturbance area would not exceed 20 acres of habitat (including both uplands and aquatic habitat). Level 2 and 3 are for projects that last more than one season and projects with varying levels of permanent impacts. CPP would affect approximately 41 acres of habitat, including 40.3 acres of potential upland habitat but would have no permanent impacts, nor last more than one season. Therefore the impacts are most similar to a Level 1 project. However, because greater than 30 acres will be affected the effects are considered level 3 effects.

CPP would implement the following mitigation for the CPP project, as described in the programmatic consultation:

- Restore temporary impacts areas to giant garter snake habitat
- Monitor for one year post-construction with photo documentation report due one year from the restoration implementation showing pre- and post-project area photos
- In order to compensate for temporary impacts of the proposed project on the snake, SMUD proposes to provide 41 acres of mitigation by one or a combination of the following methods:
  - Prior to start of construction on the gas pipeline west of Folsom South Canal, pay a fee to the USFWS Endangered Species Fund for use in purchasing, enhancing, and managing habitat for endangered species. The amount would be equivalent to 41 acres at a rate of $37,500.
  - Prior to start of construction on the gas pipeline west of Folsom South Canal, purchase credits in a USFWS-approved mitigation bank. Such an approved mitigation bank might include one operated by Wildlands, Inc. Payment to Wildlands would fulfill SMUD's responsibility for snake compensation.
  - Purchase or dedicate through a conservation easement and management plan 41 acres of GGS habitat acceptable to the Service within the Sacramento Valley Recovery Area. To ensure timely purchase and/or dedication of such acreage, SMUD will place one million five hundred thirty-seven thousand five hundred dollars ($1,537,500) in an escrow or trust account prior to the initiation of construction. In addition, SMUD will comply with the following milestones:

> Prior to starting construction of the gas pipeline west of Folsom South Canal SMUD will nominate a 41-acre parcel(s) for Service review.

> If the Service rejects SMUD's proposed parcel(s) the Service will provide specific comments to allow SMUD to find suitable parcel(s). SMUD will then have two additional months to supply the Service with new parcel(s) for Service review.

> Once the Service approves SMUD's proposed parcel(s) (the "Property"), SMUD will purchase or show reasonable progress toward purchase of the Property within three months of Service approval.

> Within six months after purchase of the Property, SMUD or a management entity such as Wildlands will submit a management plan and conservation easement for Service review.

> Within six months of Service approval of the management plan and conservation easement, SMUD will record the conservation easement and fund the ongoing management endowment. This action will transfer the easement and management of the property to a conservation entity capable of holding a conservation easement or a mitigation bank type company such as Wildlands.

> SMUD will use the funds placed in the escrow or trust account to acquire the Property, develop a conservation easement, and provide for ongoing management of the Property in perpetuity. Any funds not needed to support the requirements of this Paragraph will be returned to SMUD. In no event will SMUD be required to provide funds in excess of $1,537,500 to fulfill its requirements under this option.

> In the event that SMUD and USFWS are unable to agree upon a suitable property and/or SMUD is unable to purchase the identified property by May 1, 2004, SMUD will complete either item 21(a) or 21(b) by June 1, 2004, unless the USFWS provides an extension to SMUD.

– Prior to start of construction on the gas pipeline west of Folsom South Canal, protect and manage in perpetuity with a conservation easement and perpetual endowment 41 acres of snake habitat at a Service-approved location (conservation area). This easement shall be recorded at the county recorder's office prior to the above referenced construction. The easement, including a title report for the land area and management plan for the easement, shall be reviewed and approved by the Service prior to recording in the County Recorders Office. A true copy of the recorded easement shall be provided to the Service within 30 days after recordation. SMUD will identify locations to establish the conservation area prior to construction.

In addition, in areas identified as potential GGS habitat (defined as within 200 feet of suitable aquatic habitat, and shown on project maps) CPP will require that the following terms and conditions shall be applied:

1) Vehicles will be confined to existing roads, approved access roads, or the ROW, and will not travel in excess of 20 miles per hour on approved access roads or the ROW.

2) Refueling and hazardous materials storage will be restricted to areas at least 100 feet from wetlands, streams, or drainages. When Avoidance of 100 feet is not possible, refueling and hazardous materials storage will be limited to designated areas that are protected with berms lined with non-porous material to ensure that accidental spills will not contaminated the water body. All hazardous spills will be cleaned up immediately and disposed of properly.

3) Construction areas and ROWs will be flagged in order to clearly delineate the boundaries of construction activities. All construction activities will occur within the boundaries of the construction areas and ROWs.

4) All construction personnel will receive environmental awareness training from a Service-approved biologist prior to commencing construction activities. In addition to the topics discussed in the Plan, the training will instruct workers to recognize the snake and its habitat(s), provide procedures for observations of live and dead snakes in the project area, and describe the terms and conditions of this biological opinion. Any construction personnel who do not attend the initial worker environmental awareness training will be provided worker environmental awareness training prior to entering project work sites and/or participating in project activities. Additional worker environmental awareness training will be provided as needed as outlined in the Plan. Proof of environmental awareness training will be submitted in writing to the USFWS, Endangered Species Division.

5) A Service-approved biologist will survey open trenches each morning prior to commencing construction activities.

6) Twenty-four hours prior to construction activities, the construction area will be surveyed for snakes by a Service-approved biologist. If a lapse in construction activity of two weeks or greater occurs, surveys of the project area will be repeated.

7) A Service-approved biologist will be on-site during construction activities in potential snake habitat to perform supplemental surveys prior to construction and to monitor compliance with the biological opinion. If a snake is encountered during construction, activities will cease immediately until the Service-approved monitoring biologist has determined that appropriate corrective measures have been completed or has determined that the snake will note be harmed. If a snake becomes trapped inside any exclusion fence, it will be moved by a Service-approved biologist to the nearest available suitable habitat (< 300 feet). Any sightings, incidental take, or handling of snakes shall be reported to the USFWS within twenty-four hours by telephone to (916) 414-6600.

8) A monitoring report shall be prepared for each snake survey conducted and will be delivered to the Chief of the Endangered Species Division, Sacramento Fish and Wildlife Office, 2800 Cottage way, Room W-2605, Sacramento, California 95825-1846.

9) Construction activities in snake habitat will be conducted between May 1 and October 1.

10) At the conclusions of each day's trenching activity, the end of the trench will be ramped at an approximate two to one slope to allow any snakes that fall into the trench to escape. Trench backfilling will occur within 72 hours of pipeline installation to minimize the potential for snakes to fall into the trench. Immediately following trench backfilling, clean-up activities will be initiated.

11) Vegetation will be cut at ground level whenever possible, leaving existing root systems intact. Vegetative debris will be removed from wetlands and waterways for disposal, unless otherwise requesting in writing by property owners or habitat managers.

12) No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on the project site when working in 200 feet of snake aquatic or rice habitat. Possible substitutes include coconut coir matting, tackified hydroseeding compounds, or other materials approved by the Service.

13) During construction, all surface debris will be carefully removed to avoid contact with or disturbance of snakes. Construction material and debris will be managed to avoid providing cover for the snake.

14) All construction debris and stockpiled materials will be removed at the conclusion of construction.

15) A post-construction monitoring report prepared by the monitoring biologists will be forwarded to the USFWS within 60 calendar days of the completion of construction activity or within 60 days of any break in construction activity lasting more than 60 days. This report will detail: (1) dates that construction occurred; (2) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (3) an explanation of failure to meet such measures, if any; (4) known project effects on federally listed species, if any; (5) occurrences of incidental take of federally listed species, if any; and (6) other pertinent information.

16) Non-agricultural lands in the project area will be replanted. Plantings will consist of wetland emergents, (b) low-growing cover on or adjacent to banks, and (c) upland plantings/seed mix to encourage use by other wildlife and to discourage invasion by noxious weeds. To the extent feasible, cuttings, plantings, plugs, or seeds from local sources will be obtained. This will first consist of stockpiling, then replacing the topsoil from the existing banks, which will contain rhizomes and seeds of the existing fresh emergent wetlands habitat. This will be supplemented on an as-needed basis. The goal will be to restore conditions similar to that of adjacent habitats.

17) Emergent wetland plants used for habitat restoration will, at a minimum, consist of California bulrush (*Scirpus californicus*), and cattail (*Typha latifolia*).

18) Cover species on or adjacent to the bank may include California blackberry(*Rubus vitifolius*) and wild grape (*Vitis californica*), along with the seed mix below.

19) The upland seed mix will consist of 20-40 percent native seeds (e.g annual fescue [*Vulpia spp.]*, California brome (*Bromus carinatus*], blue wildrye [*Elymus glausus*] and needlegrass [*Nassella spp.]*, 2-10 percent native forms, 5 percent rose clover (*Trifolium hirtum*), and 5 percent alfalfa (*Medicago sativa*). Approximately 40-68 percent of the seed mix may be non-invasive European annual grasses (e.g. wild oats [*Avena sativa*], wheat [*Triticum* spp.] and barley [*Hordeum vulgare*]. Aggressive, invasive non-native grasses will not be included in the mix. This seed mix is applicable to snake habitat in the project area.

20) Monitoring of the restoration areas will be provided as prescribed by Service guidelines. Monitoring reports for restored areas will be submitted to the Chief of the Endangered Species Division: (1) upon completion of restoration implementation and (2) one year from restoration. Monitoring reports will include photo documentation, a map

illustrating the locations of restoration activities, when restoration was completed, what materials were used, plantings, and justifications of any substitutions. Monitoring reports will be submitted to the Chief of the Endangered Species Division, Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-1605, Sacramento, California 95825-1846.

5.9A Protection Measures for Valley Elderberry Longhorn Beetle

Valley Elderberry Longhorn Beetles (VELB) require elderberry shrubs to feed, reproduce and grow. According to USFWS protocol shrubs with stalks greater than 1.0 inch in diameter are required for VELB. Shrubs greater than 100 feet from construction are considered avoided. The following measures would be implemented for any shrubs within 100 feet, and that have stalks of greater than 1 inch in diameter.

1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer had been approved by the Service, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.
2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.
4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Restoration and Maintenance

1. Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.
2. Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.
3. No insecticides, herbicides, fertilizers, or other chemical that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.
4. The applicant must provide a written description of how the buffer areas are to be restored, protected, and maintained after construction is completed.
5. Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry plant stems. Mowing

must be done in a manner that avoids damaging plants (e.g. stripping away bark through careless use of mowing/trimming equipment).

5.10A Mitigation and Protection Measures for Swainson's Hawk

Swainson's hawks nest in large riparian cottonwoods, oaks, and similar large trees and forage over short-grass prairies and farm fields up to 10 miles from the nest. CDFG records and field observations record no historical nests within 3 miles of the project site. Approximately 5 historical nests occur within 0.5 mile of the pipeline. Swainson's hawks are sensitive to disturbance during nesting and CDFG recommends a 0.5-mile buffer between construction and active nests. Several areas along the gas pipeline route have the potential for nests, particularly in the Cosumnes Nature Preserve. A Swainson's hawk could nest in any of these in any year. If present, construction within short distances could cause modified behavior, reduced feeding efficiency or even nest abandonment.

Mitigation and protection measures for Swainson's hawk include:

- Implement nest surveys within 0.5 mile of project features in early spring 2003 to determine use by Swainson's hawk if construction during the nesting season is anticipated.
- If project features are within 0.5 mile of Swainson's hawk nesting, avoid construction within 0.5 mile during nesting season, if feasible. Consult with CDFG to determine measures that would allow construction within 0.25 mile of an active nest. Typical measures may include:
  - Full-time Biological Monitor while birds are on the nest.
  - Biological Monitor will require construction to cease if a nesting hawk shows signs of distress or abandonment due to construction disturbance.
  - If young are abandoned in the nest, or excluded from nest, salvage young and transport to the UC Davis Raptor Research Center or equivalent for rearing and hacking, with CDFG approval.
  - SMUD will be responsible for all costs associated with rearing and hacking abandoned young.
  - Prepare monitoring report reporting results of monitoring and construction.

CEC has requested that additional compensation habitat be provided to the area displaced by permanent development of the power plant. SMUD has proposed the following:

Provide for 1:1 acres of suitable foraging habitat for Swainsons' hawk at the same location as on-site vernal pool creation and preservation activities. Funding for management and conservation easement to be delegated to the Sacramento Open Lands Trust or equivalent third-party as for fairy shrimp and giant garter snake.

5.11A Protection Measures for Western Burrowing Owl

The burrowing owl is known to nest in the Central Valley. Railroad berms, canal banks and agricultural areas near the project site may contain suitable habitat for burrowing owls, although only one pair was detected in 2002 surveys along Sims Road. Burrowing owl sign was reported from 0.2 mile north of the project site in 2001, but no owls were seen in surveys of the site in 2001 or 2002.

The following measures would minimize the potential impacts to burrowing owls:

- Preconstruction surveys of pipeline and linear facilities would be conducted in the spring to determine whether the ground squirrel burrows are occupied by burrowing owls if construction is planned for the nesting season.
- Protect active nest burrows with a 250-foot buffer during the breeding season (February 1 through August 31) or until young have left the nest.
- Conduct passive relocation prior to construction if winter burrows are found before February 1 and/or restrict construction activities within 150 feet during non-breeding season.
- Provide habitat compensation for any active nest burrow that could not be avoided during construction through consultation with CDFG.

5.12A Protection for Nesting and Migratory Birds

Raptors, herons, egrets, waterfowl, and belted kingfisher are resident and migratory species occurring in the CPP project area, and are protected under the Migratory Bird Treaty Act and California Fish and Game Code. Disturbance of nest sites, which is prohibited under Section 3503.5 of the Fish and Game Code, could result in abandonment of eggs or young.

Preconstruction surveys will be conducted for nesting raptors within 500 feet of construction activities. Resident birds often begin nesting as early as February in California. Nest searches will be conducted in December/January (if not earlier) before site construction begins and the vegetation within laydown and construction areas will be removed and/or mowed by February 1st to minimize the potential for birds to nest in the construction areas. If nests are found with no eggs or young, the nest will be removed. If nesting birds with eggs or young are found during the surveys, the Biological Monitor will coordinate with the Designated Biologist and CDFG for possible relocation or rehabilitation at an approved wildlife rehabilitation center.

Field surveys to identify active raptor nest sites will be conducted in the spring prior to construction. If nest sites are found within 500 feet of construction areas, the Designated Biologist will implement mitigation measures appropriate to the circumstances. In most cases, a construction zone limit will be placed around the nest site at a distance of 500 feet. If an exclusion zone cannot reasonably be implemented at this distance, the following measures may be implemented:

1. SMUD may postpone construction in that area until young are fledged, or

2. Provide a Biological Monitor to monitor the birds on the nest and stop construction if it appears that the birds will abandon the nest or young, or
3. Consult with the CDFG if construction appears to jeopardize the nesting success and provide for the artificial rearing of eggs or young by qualified staff.

5.13A Mitigation for Impacts to Birds from Collisions with Electric Transmission Lines

The Central Valley withinin the Pacific Flyway is used by migratory birds in the area, and a new transmission line in this corridor may result in a minor increase of bird collisions. Special consideration was given to the potential impacts on raptor and migratory bird species. The transmission line route was designed to minimize the length and crossing of open areas (often used as forage during migration) thereby limiting the collision opportunities for resident and migratory birds. To prevent electrocutions, the transmission line will be designed to space conductor wires further apart than the wing span of a large birds (43 inches on the vertical and 60 inches on the diagonal) (APLIC 1996) and is commonly used as mitigation for reducing potential avian electrocutions and collisions. No further mitigation is proposed for impacts from the electric transmission line.

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6.0A Conclusion and Determination of Project Effects for Terrestrial Species

Effect determinations for each of the special-status species that could potentially occur in the project action area were discussed in the previous sections. The following paragraphs summarize those effect determinations for the listed and special concern species that are known or are assumed to occur in the project area that could be affected by CPP construction and operation after mitigation and protection measures are implemented.

Threatened (T), Endangered (E), Proposed Threatened (PT) or Proposed Endangered (PE) Species

The CPP project overall *may affect, but is not likely to adversely affect,* the federal listed species that are known or assumed to occur in the action area. These listed species include vernal pool tadpole shrimp, vernal pool fairy shrimp, Valley elderberry longhorn beetle, and giant garter snake. With protection and mitigation measures developed through consultation with the USFWS and CDFG, the CPP project avoided and minimized construction and operation impacts to the furthest extent feasible.

The ratio for compensatory habitat purchase and preservation was determined through informal consultation with USFWS and CDFG. The location for the proposed mitigation will support habitat for the special-status species identified in this consultation and will be approved by USFWS and/or CDFG prior to construction.

State Listed only Species

The CPP project *may affect, but is not likely to adversely affect,* Swainson's hawk and greater sandhill crane. With protection and mitigation measures developed through consultation with CDFG, the CPP will provide appropriate off-site habitat compensation for the loss of forage habitat. The location for this proposed mitigation will be approved by CDFG prior to the start of construction.

Candidate Species, Sensitive Species and Species of Concern

The CPP project *may affect, but is not likely to adversely affect,* the species of concern and species of special concern. These species include California tiger salamander, burrowing owl, American bittern, and other nesting or migratory birds in the Pacific Flyway.

Protection and mitigation measures developed for the listed species will provide protection for species of concern that are not protected under the ESA.

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7.0A References

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2.0B Special-Status Fish Species Accounts and Status in the Action Area

These sections of the BA (Sections 2.0B through 6.0B) address the project's potential effects on aquatic species and Essential Fish Habitat (EFH) for Pacific salmon. Specifically, the effects of project construction and operation activity on listed aquatic species and their habitats and EFH for Pacific salmon including natural gas pipeline crossings on the Cosumnes River, Badger Creek, and Laguna Creek were analyzed. In addition, the effects of project operations associated with the use of surface water from the Folsom-South Canal were analyzed for impacts to special-status species. Proposed protection and mitigation measures for potential impacts to aquatic special-status species and EFH are presented in Section 5.0B.

2.1B Chinook Salmon

The **winter-run Chinook salmon** (*Oncorhynchus tshawytscha*) is a federal (59 FR 440) and State endangered species. The **spring-run Chinook salmon** (*Oncorhynchus tshawytscha*) is a federal (64 FR 50393) and State threatened species. Fall and late-run Chinook are not listed for protection under either the California or federal ESA; however, these species are included as Pacific salmon, which support recreational and commercial fisheries. Pacific salmon are known to inhabit the American, Cosumnes, and Sacramento rivers (Moyle *et al.,* 1995; Moyle 2002; Yoshiyama *et al.,* 1998; Snider and Reavis 2000) in the Action Area, and therefore these water bodies have been identified as Essential Fish Habitat (EFH) for Pacific salmon. EFH is the aquatic habitat (water and substrate) necessary to fish for spawning, breeding, feeding, or growth-to-maturity that will allow a level of production needed to support a long-term, sustainable, commercial fishery and contribute to a healthy ecosystem (NMFS 1998).

In the Action Area, winter-run Chinook salmon use the Sacramento River downstream of the confluence with the American River as a migratory corridor for both upstream migrating adults and downstream migrating juveniles (NMFS 1993; NMFS 2000). Juvenile winter-run sized Chinook salmon also have been reported from the lower reach of the American River in the immediate vicinity of the confluence with the Sacramento River (Snider, CDFG, pers. com.). Spawning and egg incubation by winter run salmon does not occur in the project area, but does occur further upstream outside of the project area in the Sacramento River (Reynolds *et al.,* 1990). The Sacramento River has been designated by NMFS as critical habitat for winter-run Chinook salmon (58 FR 33212).

In the Action Area, spring-run Chinook salmon use the Sacramento River downstream of the confluence with the American River as a migratory corridor (Reynolds *et al.,* 1990; Yoshiyama *et al.,* 1998; CDFG 1998) for both upstream migrating adults and downstream migrating juveniles. Juvenile spring-run Chinook salmon may use the lower reach of the American River in the immediate vicinity of the confluence with the Sacramento River as foraging habitat during emigration. Spawning and egg incubation by spring-run salmon

does not occur in the project action area, but does occur further upstream in the Sacramento River and its tributaries (e.g., Mill and Deer creeks; Reynolds *et al.* 1990; Moyle *et al. 1995;* Mills and Ward 1996; Yoshiyama *et al.* 1998; NMFS 2000).

Reasons for decline in the populations of fall-run Chinook include inaccessibility of spawning grounds due to dams and water management projects, entrainment into unscreened agricultural diversions, overfishing, high seasonal water temperatures, and poor water quality (Yoshiyama *et al.,* 1998; CDFG 1993; USBR 1997). Pacific salmon are known to inhabit the Sacramento, American, and Cosumnes rivers (Yoshiyama *et al.,* 1998; Moyle 2002; SWRI 2001; Snider and Reavis 2000), and therefore these areas have been identified as EFH for Pacific salmon, including fall-run Chinook salmon.

The Cosumnes River historically and currently supports a small run of Chinook salmon (Snider and Reavis 2000; Taylor 1974; Kano 1998; NRCS 2002; Reavis 1981;), but since 1987 there were 3 years of no flow during the spawning period that precluded a continual natural run of salmon (USBR 1997). Information on the natural resources and habitat conditions for fish and wildlife, in addition to information on land use, hydrology, soils, sediment, geology, water quality, and cultural resources of the Cosumnes River has been compiled by the Natural Resources Conservation Service (NRCS 2002) in cooperation with the Sloughhouse Resource Conservation District and the Cosumnes River Task Force. Information on Chinook salmon spawning, rearing, and juvenile emigration from the Cosumnes River has been reported by Snider and Reavis (2000), for surveys conducted during 1998-1999 which, in addition to NRCS 2002, Whitener 2002, and others, provides the baseline information for analyzing potential effects. The lower reach of the Cosumnes River is tidally influenced approximately 25 yards upstream from the confluence of Laguna Creek. Most years the mainstem of the Cosumnes River has no flow upstream of Laguna Creek during the dry season (Whitener 2002). Fall-run Chinook salmon may migrate up the Cosumnes River when the river begins to flow again after a series of rain events in November (Snider and Reavis 2000; Whitener 2002). The river can fill as early as mid-October and as late as mid-December, and some years it does not fill at all (Whitener 2002). Downstream emigration of juvenile salmon would occur during the late winter and spring period when water is in the river and when temperatures are appropriate, primarily March and April (Whitener, 2002, Moyle *et al.*, 1995; Snider and Reavis 2000). Flows dry up in much of the river from June to August (Whitener 2002).

Lower American River fall-run Chinook salmon spawning contributed approximately 21 percent (i.e., 41,040 fish) to total fall-run Chinook salmon spawning (i.e., 197,740 fish) in the Sacramento Valley river system of the Central Valley Project, including the Sacramento River and its tributary rivers and creeks, during the 1967-1991 time period which represents the Anadromous Fish Restoration Program (AFRP) restoration goal baseline period (SWRI 2002, unpublished data). Chinook salmon from the American River represent both in-river production and fish produced in the CDFG Nimbus Hatchery. Adult Chinook salmon typically migrate into the lower American River during the fall (September-December) with spawning generally occurring between October and December (SWRI 2001). After hatching, juvenile Chinook salmon emigrate from the American River both as fry, typically during late January-early March, and as smolts during the period from April to early June (SWRI 2001).

Central Valley Chinook salmon populations, particularly winter-run and spring-run Chinook salmon, have experienced declining abundance over the past several decades (Yoshiyama *et al.,* 1998; Moyle *et al.,* 1995). Reasons for decline in populations include dam construction, water diversion, groundwater withdrawal, poor water quality management, loss of spawning grounds, and impingement and entrainment of juvenile fish at water diversions (Yoshiyama *et al.,* 1998; Moyle *et al.,* 1995; Reynolds *et al.,* 1990; CDFG 1993; Mills and Ward 1996).

2.2B Central Valley Steelhead

The **Central Valley steelhead** (*Oncorhynchus mykiss*) is federally listed as threatened (65 FR 42422-42481). Steelhead migrate through the Sacramento/San Joaquin river systems and up the Sacramento, Cosumnes, and American rivers (Reynolds *et al.,* 1990; NRCS 2002). Historically, the majority of anadromous salmonid spawning and rearing habitat within American River was located in the watershed above Folsom Dam. The lower American River currently provides spawning and rearing habitat for steelhead below the Nimbus Dam. The majority of the steelhead run returning to the hatchery is of hatchery origin. The proportion of hatchery origin fish spawning in the river, however, remains uncertain (SWRI 2001). Adult steelhead typically migrate upstream from December through April with juveniles typically emigrating from November through May (SWRI 2001). In the Cosumnes River, steelhead migrate in winter and early spring only when there is sufficient water in the river (Whitener 2002). Reasons for the decline of the steelhead include, but are not limited to, dam construction, water diversion, groundwater withdrawal, poor water quality management, loss of spawning grounds, and impingement and entrainment of juvenile fish at water diversions (McEwan and Jackson 1996; NMFS 1996).

2.3B Sacramento Splittail

The Sacramento splittail (*Pogonichthys macrolepidotus*) is a federal threatened species (64 FR 25). It is endemic to the Central Valley in California and is known to inhabit the Sacramento, lower American, and Cosumnes rivers (SWRI 2001; Moyle *et al.,* 1995; Moyle 2002). In these watersheds, areas inundated by floodwaters provide suitable spawning habitat (Whitener 2002). Sacramento splittail primarily occur in slow-moving reaches of the main rivers and the Delta (Moyle 2002; Moyle *et al.,* 1995). Peak spawning occurs from March through May in sloughs and other shallow, slow-moving water habitats (Moyle 2002; Wang 1986). Spawning by splittail may occur in reaches of the Sacramento, Cosumnes, and American rivers potentially affected by the Proposed Action. These habitats also are utilized seasonally by adult and juvenile splittail as foraging areas.

Reasons for decline in the Sacramento splittail population may include, but are not limited to, water diversions, reduced Delta outflow, channelization and reduction in flood plain inundation, entrainment in diversions, adverse water quality, and loss of shallow water breeding habitats (Moyle *et al.,* 1995; USFWS 1996).

2.4B Delta Smelt

Delta smelt (*Hypomesus transpacificus*) are listed as a threatened species under both the California and federal Endangered Species Acts (58 FR 12854). Delta smelt primarily inhabit the Sacramento River downstream of the confluence with the lower American River, and the Bay-Delta estuary (USFWS 1996). The Sacramento River downstream of Sacramento has been designated by USFWS as part of critical habitat for delta smelt (59 FR 65256). The lower American and Cosumnes rivers are not within the area designated as critical habitat for Delta smelt (59 FR 65256). Delta smelt typically have a 1-year lifecycle with adults spawning during the late winter and early spring (USFWS 1996; Moyle 2002; Wang 1986). Eggs are adhesive on hard substrate (Moyle 2002; USFWS 1996). After hatching, planktonic larvae drift downstream with river currents into the Bay-Delta estuary, which provides juvenile rearing habitat (Wang 1986; USFWS 1996).

2.5B Essential Fish Habitat (EFH) for Pacific Salmon

This document analyzes potential effects to EFH as required by the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). It is also consistent with guidelines detailed in Amendment 14 to the Pacific Coast Salmon Plan, Appendix A (Pacific Fisheries Management Council 1999). EFH only applies to the habitat of commercial fish species (i.e., all Chinook salmon habitat, but not steelhead habitat) and includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity (NMFS 1998). EFH includes all anadromous streams (including some intermittent streams) up to impassable barriers (Pacific Fisheries Management Council 1999). In the Central Valley, it also includes accessible waters of the Delta, Sacramento River, and tributaries up to impassable barriers. In the American River basin, EFH includes the lower American River up to Nimbus Dam. Keswick Dam represents the first impassable barrier on the Sacramento River, within the study area. The evaluation presented in this document satisfies EFH consultation requirements. Thus, a separate EFH document is not needed.

For the purposes of this BA, Pacific salmon includes spring-run, winter-run and fall/late-fall run Chinook salmon. Although fall/late-fall run Chinook salmon is not a federally listed species, as a Pacific salmon, its habitat is included under the MSFCMA protections for EFH. EFH for Chinook salmon includes all streams, lakes, ponds, wetlands, tributaries, and other water bodies currently viable and most of the habitat historically accessible to Chinook salmon. Within the proposed action area, the Sacramento River provides habitat for spring-run and winter-run Chinook salmon; and the lower American River and Cosumnes River provide habitat for fall/late-fall run Chinook salmon (See Section 2.1B).

3.0B Direct and Indirect Effects of the Proposed Action on Protected Fish Species, Critical Habitat, and Essential Fish Habitat for Pacific Salmon

3.1B Introduction

The proposed action was evaluated to determine potential direct and indirect effects to special-status aquatic species, critical habitat and Essential Fish Habitat (EFH) for Pacific salmon that may result from construction or operation of the CPP facilities.

3.1.1B Methodology

The assessment of potential construction or operational effects upon special-status fish species in the proposed action area considers the potential occurrence, lifestages and habitat requirements (e.g., instream flow and water temperature) for the individual species addressed by this BA. The potential for adverse effects is evaluated by a comparison of anticipated project conditions relative to existing or baseline conditions.

Construction-related effects to fishery resources, including water quality, were determined using available information regarding anticipated construction methods for the power plant, natural gas pipeline, and associated facilities. The assessment of potential construction-related effects assumes implementation of standard construction best management practices (BMPs) for the protection of aquatic resources. Section 5.0B presents the general protection and mitigation measures for fishery resources.

Operation-related effects upon fishery and water quality resources were determined based on anticipated operation practices which include the incorporation of identified biological resources protection measures to minimize potential adverse effects (i.e., stormwater detention and discharge facilities.

Hydrologic and water temperature modeling was performed to evaluate the potential effects of the proposed action related t o the operational effect of the increased water diversions from the Folsom South Canal (FSC) on the lower American River, Sacramento River and Delta. Model simulations were developed to represent the baseline (existing) conditions and proposed action conditions. These simulations are based on a 70-year (1921-1991) hydrologic period of record and a 69-year (1922-1990) water temperature period of record. Appendix D, Fisheries and Aquatic Habitat, provides additional detail regarding the modeling simulations and assumptions. The results of these simulations were then compared to determine the potential for proposed action-related changes to instream flows or water temperature as indices for habitat quality and availability in the lower American

River, Sacramento River and Delta. Appendix D presents detailed results for each of the effect topics and simulation comparisons for aquatic species.

3.1.2B Baseline Condition

The ESA Baseline Condition includes "the past and present impacts of all federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process" [50 CFR Section 402.02].

For the Cosumnes River, Badger Creek, and Laguna Creek, information on the natural resources and habitat conditions for fish and wildlife, in addition to information on land use, hydrology, soils, sediment, geology, water quality, and cultural resources of the Cosumnes River has been compiled by the Natural Resources Conservation Service (NRCS 2002) in cooperation with the Sloughhouse Resource Conservation District and the Cosumnes River Task Force. Additional information on Chinook salmon spawning, rearing, and juvenile emigration from the Cosumnes River has been reported by Snider and Reavis (2000), for surveys conducted during 1998-1999. Whitener (2002) provides additional information on fishery and aquatic habitat in the area. Information from these and other sources provides the baseline conditions used to evaluate potential project effects on fishery resources and EFH within the Cosumnes River watershed.

Modeling assumptions incorporate the terms and conditions of Biological Opinions (BOs) prepared by resource agencies for past and ongoing federal actions. The existing condition simulation does not include the use of any water associated with federal actions that have not yet completed ESA Section 7 consultation. The terms and conditions of the following Biological Opinions are incorporated into the hydrologic modeling assumptions related to State Water Project (SWP) and Central Valley Project (CVP) operations for the existing condition, which therefore represents the ESA baseline for the evaluation of the proposed action upon the lower American River, Sacramento River, and the Delta:

- Biologic Opinion for Delta Smelt – Los Vaqueros (USFWS);
- Biologic Opinion for Delta Smelt – Operations and Criteria Plan (OCAP) (USFWS);
- Biologic Opinion for Winter-run Chinook Salmon – per the Bay-Delta Accord (NMFS);
- Conference/Biologic Opinion for Sacramento Splittail – Long-term OCAP (USFWS); and
- Biologic Opinion for Steelhead (NMFS).

Additional information used to establish baseline conditions, particularly with respect to life history requirements and habitat conditions for protected species, critical habitat, and EFH within the lower American River, Sacramento River, and Delta (briefly summarized in Section 2.0B), has been developed from CDFG (1993), Mills and Ward (1996), Moyle (2002), Moyle *et al.* (1995), NMFS (1993), Reynolds *et al.* (1990), SWRI (2001), USFWS (1996), Wang (1986), Yoshiyama *et al.* (1998), and other reference documents. Information available from these sources, in combination with BOs and hydrologic modeling, provide the basis for evaluating potential project-related effects on fishery resources and their habitat.

3.1.3B Effects of the Proposed Action

Effects to the aquatic species under discussion can be short-term (one or two reproductive seasons) or long-term (affecting several generations), direct (immediate effects of the proposed action on a species or its habitat), or indirect (effects that result from the proposed action and are later in time, but are still reasonably certain to occur).

Potential effects to aquatic species, critical habitat, or EFH for Pacific Salmon that may result due to construction or operation of the CPP include the following:

- Temporary construction-related effects to water quality and aquatic resources in the Cosumnes River, Badger Creek, and Laguna creeks;
- Water quality effects to the Cosumnes River, Badger Creek, and Laguna Creek due to plant stormwater discharges;
- Introduction of blockage or impediments to migration in the Cosumnes River and/or Badger or Laguna creeks resulting from construction of the CPP;
- Reduced streamflow in the lower American River resulting from cooling water deliveries diverted through the FSC;
- Increased water temperatures in the lower American River as a result of reduced streamflow and/or reduced storage in Folsom and Nimbus Reservoirs;
- Reduced streamflow in the Sacramento River resulting from cooling water deliveries diverted through the FSC;
- Increased water temperatures in the Sacramento River as a result of reduced streamflow; and
- Changes in the location of X2[1] in the Delta resulting from reductions in streamflow in the lower American and Sacramento rivers.

3.2B Construction-Related Effects

Construction of the CPP project site would require that 30 acres be leveled and elevated. A stormwater detention basin and discharge outfall structure would be constructed within the 30 acres of the CPP project site to accommodate the project's stormwater runoff. During project construction, the project would also have a temporary 20 acre laydown area, just south of the project site. The construction of the CPP gas pipeline would require crossing under the Cosumnes River, Badger Creek, and Laguna Creek, via the Horizontal Directional Drill (HDD) construction method.

Construction of the natural gas pipeline and the power plant have the potential to contribute pollutants affecting the water quality or aquatic resources of the Cosumnes River, Badger Creek, and Laguna Creek. Specific aquatic resources protection measures have been incorporated into the project construction plans to minimize or avoid these effects, as

[1] X2 is the geographic location (measured in kilometers from the Golden Gate) of the 2 parts per thousand (ppt) salinity isohaline. X2 is used as an indicator of estuarine habitat conditions for fish and macroinvertebrates. The location of X2 varies in response to the magnitude of freshwater inflow and outflow within the Bay-Delta estuary.

described below. Construction of the CPP facilities would not have any direct or indirect effects upon the Sacramento River where spring-run and winter-run Chinook salmon are known to occur within the project area or upon critical habitat for winter-run Chinook salmon (Sacramento River). Additionally, construction of the CPP facilities would not have any direct or indirect effects upon lower American River or Delta fisheries resources, including EFH. This is because there are no construction related activities associated with the Sacramento River, American River, or the Delta.

3.2.1B Water Quality

3.2.1.1B Sedimentation

The proposed action *may affect, but is not likely to adversely affect* EFH within the Cosumnes River watershed for Pacific salmon, steelhead, or splittail or their habitat due to increased sedimentation associated with the construction of the natural gas pipeline and the powerplant. To minimize the potential affects, construction of the natural gas pipeline crossings under the water channels of Cosumnes River, Badger Creek, and Laguna Creek would occur when the streambeds are dry (August through October, see Section 5.0B). The pipeline would also be installed utilizing the HDD construction method. Under this method, the pipeline would be installed more than 30 feet below the channel bottoms, without affecting the channel surfaces. Constructing the pipeline when the streambeds are dry and the use of the HDD construction method would minimize the potential for adverse effects to water quality that could affect listed species and/or EFH.

The potential risk associated with the use of the HDD construction method is if a "frac-out" occurs. A frac-out is the release of the bentonite slurry drilling lubricant from the drilling hole to the surface through a fissure or crack in the soils. Bentonite is a non-toxic clay material and commonly used in farming practices as a soil enhancement. However, benthic invertebrates, aquatic plants, and fish and their eggs can be smothered by the fine particles if bentonite is discharged to waterways that support these aquatic species. HDD construction method would take place only during the summer months when salmonid species are not present either in the waterways or the CPP construction site. Low flow and high summer time temperatures would prevent salmonid populations from the construction areas. A potential effect associated with a frac-out would be limited only to the Sacramento splittail. If a frac-out were to take place in splittail habitat, potential effects to water quality and Sacramento splittail could occur.

An extensive body of scientific information exists regarding the relationship between exposure of fish and macroinvertebrates to suspended sediments (both concentration and duration of exposure) and resulting biological responses including both sublethal (e.g., changes in physiology, behavioral avoidance, reduced feeding rates, etc.) and lethal mortality. Results of exposure tests have been reported by both individual investigators (e.g., McFarland and Peddicord 1980; O'Connor 1991; and many others) which have also been compiled and synthesized by Newcombe and Jensen (1996) and Wilber and Clarke (2001). Results of these investigations have shown that the tolerance of various fish and macroinvertebrates to suspended sediments vary substantially among species. Species which inhabit estuarine environments, such as the Sacramento-San Joaquin Delta, which are characterized by relatively high ambient suspended sediment concentrations (e.g., greater than 100 mg/L), show a substantially greater tolerance to suspended sediment

concentrations when compared to species which typically inhabit environments characterized by low ambient suspended sediment concentrations (e.g., open ocean pelagic species).

Although scientific data are not available on the tolerance of splittail to suspended sediment concentrations, it is expected that their tolerance would be similar to that of other species inhabiting the Bay-Delta estuary such as striped bass. Data compiled by Wilber and Clarke (2001) for estuarine fish species generally shows a mortality threshold (10 percent acute mortality) for the majority of species at suspended sediment concentrations of approximately 2000 mg/L for a one-day exposure duration or approximately 900 mg/L for a two-day exposure duration. Data for juvenile striped bass showed no affect for an eleven-day exposure at 600 mg/L. However, there was a sublethal hematocrit (red blood cell) count (increased following a five-day exposure to a suspended sediment concentration of 1240 mg/L).

The actual exposure concentration and duration of exposure that would occur as a result of a potential frac-out is unknown and not documented since frac-outs are a very uncommon occurrences. Avoidance and minimization actions, such as those outlined in the preliminary Contingency Plan for Frac-Out (Appendix C), would serve to reduce the potential risk of adverse effects to splittail within the Cosumnes River watershed. HDD during the summer months would eliminate the potential risk of adverse effects associated with exposure to suspended sediments in the event that a frac-out should occur. As a result, the CPP proposed action *may affect, but is not likely to adversely affect* Sacramento splittail.

3.2.1.2B Stormwater Runoff

Stormwater runoff regulations require that construction activities typical to the proposed action incorporate silt fences and other means to minimize or eliminate runoff from all construction areas. Stormwater during construction of the CPP project site will be discharged according to a NPDES permit, which will be obtained prior to construction. CPP is also obtaining authorization under Section 1601 of the Fish and Game Code for construction-related crossings of 37 streams, ditches, swales and other potential wetland features in the CPP action area. Horizontal directional drill (HDD) techniques, incorporating silt fences, wattles or other appropriate BMPs would be utilized when constructing nearby or under all waterways, canals and ditches located in the action area. For additional information on construction conservation measures, refer to Preliminary Draft Stormwater Pollution Prevention Plan, dated May 6, 2002; Drainage Plan, dated January 24, 2003; and Appendix C, Preliminary Contingency Plan for HDD. Final Plans will be submitted to NMFS and USFWS for review prior to construction.

In the project construction laydown area just south to the CPP construction site where construction equipment and materials will be stored, all storm water will be contained and checked for oil. Following an appraisal by a qualified specialist that no oil sheen is present the water is oil free, the water will then be released to the nearby swale and eventually into the creek.

By incorporating the measures mentioned above, there will be no effect upon water quality due to construction-related stormwater runoff. By preventing potential for water quality degradation in the project action area, there would be no direct effects to steelhead, splittail

and their habitat areas known or assumed to occur in the Cosumnes River, Badger Creek, and Laguna Creeks. Additionally, implementation of these protection measures would avoid direct effects upon EFH for Pacific salmon (fall/late-fall run Chinook salmon) within the Cosumnes River and associated waterways.

3.2.1.3B Impediments or Barriers

The pipeline crossings under the Cosumnes River, Badger Creek, and Laguna Creek would be installed using the HDD construction method. Because the pipeline crossings would be more than 30 feet below the channel bottoms, no barrier or impediment would occur during or after construction of the pipeline that would obstruct channel flow, affect adult Pacific salmon upstream migration, or affect juvenile Pacific salmon downstream migration in the Cosumnes River, Badger Creek, or Laguna Creek. Therefore, there would be no adverse effect on EFH for Pacific salmon, or upon steelhead or splittail or their habitat.

3.3B Operational Effects

Operational effects associated with the CPP project consist of stormwater runoff from the project site and the diversion of Folsom South Canal water for project cooling purposes. There would be no operational effects associated with the gas pipeline because it would not create or introduce any new facility or structure that might block or impede flow or fish passage (i.e., steelhead or Chinook salmon adult upstream migration or juvenile downstream migration; adult or juvenile splittail movement) in the Cosumnes River, Badger Creek or Laguna Creek. As described previously, the natural gas pipeline crossings of these waterbodies would be installed under the water channels using the HDD construction technique. Since all crossings would be located well below the streambed, the gas pipeline would not result in the obstruction of channel flow or impairment of fish passage/movement. Therefore, there would be no direct or indirect passage effect upon Chinook salmon, steelhead or splittail in the project area.

In addition, there would be no operational effects associated with the project's wastewater discharge. The wastewater would be disposed of through the use of zero liquid discharge (ZLD) technology and would not be discharged to any water bodies. (Please refer to Section 1 and Supplement C to the Cosumnes Power Plant Application for Certification, dated July 18, 2002.)

3.3.1B Water Quality

3.3.1.1B Stormwater

As part of the CPP project, a stormwater detention basin and discharge outfall structure would be built to accommodate the project's stormwater runoff. The outfall from the basin would be designed to incorporate measures to reduce contaminants, consistent with stormwater requirements, and with a flow dissipater structure equivalent to reduce velocity and potential scouring from the outfall. These elements would minimize the potential for introduction of water quality constituents of concern into the local watershed.

During operation of the CPP, all storm water would be detained in the detention basin, where it would be checked by a qualified specialist for an oily sheen. If clean, it would be

released to Clay Creek (a tributary to Hadselville Creek and Laguna Creek). If oil is present mitigation measures would be utilized and absorbents would remove the oil form the water, then it would be released to Clay Creek.

Stormwater runoff from the CPP may affect listed aquatic species, their habitats, and EFH for Pacific salmon (fall/late-run Chinook salmon with the Cosumnes River and Laguna Creek However, with implementation of the conservation measures listed above, there would be no adverse effect on EFH for Pacific salmon, upon steelhead or splittail or their habitat.

3.3.2B Diversion of Folsom South Canal Water

3.3.2.1B Instream Flow

Operation of the CPP may affect spring-run and winter-run Chinook salmon in the Sacramento River and lower American River near the confluence with the Sacramento River; winter-run Chinook salmon critical habitat within the Sacramento River; EFH for Pacific salmon in the Sacramento River or lower American River; steelhead or its habitat in the Sacramento River or lower American River; splittail or its habitat in the Sacramento River, lower American River, Cosumnes River, or Delta; or delta smelt or its habitat in the Sacramento River or Delta. Potential effects could result from the increased diversion of water from FSC as the source of cooling water for the CPP.

The utilization of an additional 7.3 cfs of water from the FSC could potentially reduce the water available for release from Lake Natoma that would support Pacific salmon in the lower American River and downstream in the Sacramento River. The American River has an average annual unregulated runoff of 2.7 million acre-feet. Average annual runoff has varied from 900,000 acre-feet to 5,000,000 acre-feet (ACOE et al. 2001). The estimated 5,320-acre feet required annually by the CPP equates to 440 AF/month or 14.7 AF/day or 7.3 cubic feet per second (cfs).

Hydrologic modeling results (Appendix D, Fish Resources and Aquatic Habitat) showed no detectable difference (undetectable incremental change) in instream flows in the lower American River or Sacramento River when comparing the proposed action to baseline conditions. In the absence of a detectable effect of the proposed action on these habitat indicators, it was concluded that the proposed action *may affect, but would not likely adversely affect:*

- Adult winter-run or spring-run Chinook salmon migration in the Sacramento River;
- Potential foraging habitat for juvenile winter-run and spring-run Chinook salmon in the lower reaches of the lower American River above its confluence with the Sacramento River;
- Critical habitat for adult and juvenile winter-run Chinook salmon in the Sacramento River;
- EFH provided by the Sacramento River for spring-run and winter-run Chinook salmon;
- EFH provided by the Sacramento River or lower American River for Pacific salmon (fall/late-fall run Chinook salmon);

- Steelhead or its habitat in the Sacramento River or lower American River;
- Splittail or its habitat in the Sacramento River or lower American River; or
- Delta smelt or its critical habitat in the Sacramento River/Delta.

3.3.2.2B Water Temperature

Results of the hydrologic simulation model were used, in combination with the lower American River water temperature simulation model, to evaluate the potential effect of the operation of the CPP on seasonal water temperatures affecting EFH for Pacific salmon, steelhead and splittail and their habitat. Results of the modeling did not detect differences in seasonal water temperature conditions in the lower American River related to the proposed action when compared to baseline conditions (Appendix D, Fish Resources and Aquatic Habitat). These assessments considered individual fish species' requirements for spawning, egg incubation, juvenile rearing and emigration (Appendix D, Fish Resources and Aquatic Habitat). Upon review of the modeling results, it was concluded that the proposed action *may affect, but would not likely adversely affect* EFH for Pacific salmon, steelhead or splittail and their habitat in the lower American River.

3.3.2.3B Changes in the Location of X2 in the Delta

Hydrologic simulation modeling was used to analyze the potential effects of the proposed action on the location of X2 (saline/freshwater interface) in the Delta. Results of these analyses did not detect differences in the location of X2 as a result of proposed action when compared to baseline conditions (Appendix D, Fish Resources and Aquatic Habitat). Based on these results, it was concluded that the proposed action *may affect, but would not likely adversely affect* EFH for Pacific salmon, steelhead or its habitat, splittail or its habitat, or delta smelt or its critical habitat in the estuarine portion of the Delta.

3.4B Summary of Proposed Action Effects

Based on implementation of standard construction BMPs, incorporation of specific design features to avoid effects to aquatic resources, and the results of hydrologic simulation modeling (Appendix D), it was concluded that construction and operation of the proposed action *may affect, but would not likely adversely affect* Pacific salmon, steelhead, splittail or delta smelt in the Cosumnes River, Badger Creek, and Laguna Creek, the lower American River, Sacramento River, or Delta.

Installation of the natural gas pipeline during the dry season and using HDD construction technique would minimize potential effects to water quality. In addition, the gas pipeline would not result in either a blockage or impediment to Pacific salmon or steelhead adult immigration or juvenile emigration, or splittail movement in the Cosumnes River, Badger Creek, or Laguna Creek. Stormwater drainage would be in accordance with BMPs, and a stormwater drainage system would be designed to avoid erosion and scour associated with stormwater discharge. Construction BMPs and other avoidance measures would be used, in combination with HDD and would not result in adverse effects to Pacific salmon, steelhead, or splittail.

The CPP will be designed with ZLD from cooling system operations, and hence would not have any adverse water quality effect to EFH for Pacific salmon, steelhead or its habitat, or splittail or its habitat in Clay Creek. Results of the simulation modeling indicate that operation of the CPP facilities would not adversely affect EFH for Pacific salmon, steelhead or its habitat, or splittail or its habitat as the proposed action would not have a direct adverse effect on American River flows, Sacramento River flows, or the location of X2 in the Delta. Additionally, the proposed action would not adversely affect EFH for Pacific salmon, steelhead or its habitat as operation of the CPP facilities would not result in significant direct adverse affects to lower American River water temperatures.

Analyses of these features indicate that the proposed action *may affect, but would not likely adversely affect* Pacific salmon (and their EFH), steelhead or their habitat, or splittail or their habitat in the action area including the lower American River, Sacramento River, Delta, Cosumnes River, Badger and Laguna Creeks, or other tributaries within the project area.

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4.0B Cumulative Effects to Protected Fish Species, Critical Habitat, and Essential Fish Habitat for Pacific Salmon

This section provides a discussion of potentially cumulative effects that may occur in the action area with focused consideration of the Proposed Action's contribution to these effects (incremental effect analysis). This discussion includes an evaluation of CPP's fisheries resources effects, which when considered in conjunction with effects attributable to other projects (either in the vicinity or with similar characteristics), could have the potential to result in collectively adverse effects to the environment that are of greater significance than the individual effects of the proposed action. A discussion of growth-inducing effects follows the cumulative effects analysis.

For purposes of this BA, cumulative effects include the "effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act" [50 CFR §402.02].

4.1B Projects Considered as part of Cumulative Effects

4.1.1B Land-Based Activities

Non-federal projects identified in the vicinity of the proposed action include:

- An application for biosolids storage on 3 parcels on the north side of Twin Cities Road (06/11/97), adjacent to and east of Clay Station Road. Mr. Gary Silva stores and applies biosolids to cattle pastures in this area.

Non-federal projects identified in the vicinity of the proposed pipeline action include:

- An application to create two lots on the Buzdas property (9/25/00);
- An application to create a residential accessory dwelling (8/30/00);
- An application to create a residential accessory dwelling (Leonard no date);
- An application for Lakepoint Apartments –pending (no date);
- An application to rezone Park to "O" (1/27/99);
- An application from JDS Laguna Sub. Extension of Time (9/21/01);
- An application for RV and Boat storage use permit (12/31/97); and
- An application for Harris ranch #1 – now City of Elk Grove recorded 4/4/2000.

4.1.2B Water Diversion Actions

Currently proposed or future anticipated diversion projects along with various environmental initiatives use the water supplies in the American and Sacramento River basins. These include, but are not necessarily limited to, the past, present, and reasonably

foreseeable actions that are identified below. These actions and projects could result in cumulative environmental effects within the action area, including the American River Basin.

Past Actions

Significant actions have occurred over the years that, collectively, have shaped the physical, natural, regulatory, and socioeconomic environment of the Central Valley, including the action area for the CPP. On a broad scale, such past actions have included agricultural production developments, urban expansion, flood control efforts along major rivers, and increased use and management of water resources within the Central Valley for multi-purpose beneficial uses. Specific actions can be categorized into two groups associated with (1) physical changes or alterations within the Central Valley, and (2) regulatory or administrative changes to the Central Valley Project (CVP) and other projects.

The most notable physical changes include the development of the CVP and State Water Project (SWP). Dams and other water supply and flood control structure have indelibly changed the natural hydrology of many rivers within the Central Valley. Along the major tributaries to both the Sacramento and San Joaquin rivers, the construction of dams has blocked migration routes for certain anadromous fish (e.g., Chinook salmon and steelhead). From a regulatory or administrative perspective, several key guiding initiatives have influenced the manner in which the integrated CVP/SWP is operated and managed.

Past actions include the following:

- U.S. Bureau of Reclamation (Reclamation)—Auburn Dam Construction
- Placer County Water Agency (PCWA)—Middle Fork Project Development
- Reclamation—Central Valley Project Improvement Act (CVPIA)
- Reclamation and Department of Water Resources (DWR)—CVP/SWP Operations and Coordinated Operations Agreement (COA)
- State Water Resources Control Board (SWRCB)/Regional Water Quality Control Board (RWQCB)—Water Quality Control Plan (WQCP) for the Sacramento-San Joaquin River Basins
- SWRCB – San Francisco Bay-Sacramento-San Joaquin Delta Estuary Pollutant Policy Statement
- SWRCB – Bay-Delta Accord
- SWRCB – California Inland Surface Water Plan
- U.S. Fish and Wildlife Service (USFWS) – Biological Opinion for Delta Smelt – Los Vaqueros
- USFWS – Biological Opinion for Delta Smelt – Operations and Criteria Plan (OCAP)
- National Marine Fisheries Service (NMFS) – Biological Opinion for Winter-run Chinook Salmon – per the Bay-Delta Accord

- NMFS – Conference/Biological Opinion for Sacramento Splittail – Long-term OCAPl
- NMFS – Listing of Spring-run Chinook Salmon and Steelhead
- NMFS – Biological Opinion for Steelhead
- City of Roseville – Pumping Plant Expansion, Water Treatment Plant Expansion
- City of Sacramento – Water Treatment Facilities Expansion, Fish Screen Replacement Project
- San Juan Water District (SJWD) – Water Facilities Plan and Water Master Plan
- Sacramento County Water Agency (SCWA) – Application to Appropriate Water from the American and Sacramento Rivers

It is noted that these past actions, for example, meeting the conditions of the biological opinions, may be considered ongoing activities and also could be placed in the list below.

Present or Ongoing Actions

Present actions within the study area that produce effects similar to environmental effects that could occur with implementation of the Proposed Action are listed below.

- CVP Water Service Contracts
- New contracts under Public Law 101-514, Section 206
- SWP Water Customer Contracts
- American River Water Rights Users
- Reclamation/PCWA Seasonal Pump Station – Middle Fork Project Water Entitlements
- PCWA/SJWD – Long-term Groundwater Stabilization Project
- Reclamation – CVPIA Anadromous Fish Restoration Program
- Reclamation – CVPIA Dedicated CVP Yield
- CALFED Bay-Delta Program
- Bay-Delta Water Quality Hearings
- Implementation of Sacramento Area Water Forum Agreement Elements and Programs
- Temperature Control Device at Folsom Dam

Reasonably Foreseeable Actions

Future actions that affect water sources within the action area that could produce environmental effects similar to the Proposed Action include other actions or projects that would facilitate increased diversions from the CVP/SWP system and generally are anticipated to take place over the same timeframe (next 20 to 30 years).

- Renewal of CVP Water Service Contracts (American River Division actions)
- City of Roseville, EID and NWD Warren Act Contracts (American River Division actions)
- Folsom Reservoir Flood Control Operations and Dam Modifications (American River Division actions)
- Lower American River Minimum Flow Pattern (American River Division actions)

- PCWA – Auburn Pump Station
- Georgetown Divide Public Utility District Folsom North Pumping Plant
- Reclamation – CVPIA Supplemental Water Supplies
- Sacramento Regional Wastewater Treatment Plant Expansion
- Trinity River Flow Requirements
- El Dorado Irrigation District Temperature Control Device at Folsom Reservoir
- PCWA/FERC Relicensing of Middle Fork Project Operations
- DWR/FERC Relicensing of SWP/Oroville Operations

These past, present, and reasonably foreseeable actions within the regional study area would have the following types of effects:

- Increased demands to serve environmental purposes;
- Increased demands for municipal and industrial water;
- Increased operational requirements for the CVP (e.g., minimum stream flow releases, reservoir storage requirements); and
- Changes in the CVP or SWP system resulting from changes in water demand, changes in operational requirements, and new or modified CVP or SWP facilities.

These actions and projects have been incorporated into the hydrologic modeling performed for the cumulative impact assessment. Additional details regarding the assumptions are provided in Appendix D, Fish Resources and Aquatic Habitat.

Additional information regarding the actions, projects and programs listed above is available in project-specific documentation, as well as the following reports:

- Water Forum Draft Environmental Impact Report
- Central Valley Project Improvement Act Programmatic Environmental Impact Statement
- Trinity River Flow Evaluation Project Draft Environmental Impact Report/Environmental Impact Statement

4.2B Cumulative Effects Analysis

4.2.1B Land-Based

The CPP project could temporarily disturb aquatic habitat due to the construction of the power plant and gas pipeline. This disturbance, however, would be avoided and/or minimized through the use best management practices. In addition, pipeline construction would occur during the dry season and employ the HDD construction technique, as described in Section 3.0. Additionally, a response plan for HDD construction activities has been incorporated into the proposed action (Refer to Appendix C, preliminary HDD

Contingency Plan). Construction limits, environmental awareness training, biological monitoring, and habitat restoration after construction would avoid and mitigate temporary disturbances (see Section 5.0B).

4.2.2B Water Diversion

This section presents the results of hydrologic and water temperature modeling performed to evaluate the cumulative and Proposed Action incremental effects to fisheries resources. The discussion focuses only on potentially significant cumulative effects. For additional information please refer to Appendix D, Fish Resources and Aquatic Habitat.

Cumulative Effects Analysis Framework and Methodology

The future cumulative condition was modeled using Reclamations PROSIM model of the CVP and SWP, the California Department of Water Resources (DWR) Upper American River Model ("UARM") of the major reservoirs and river reaches above Folsom Reservoir, Reclamation's American and Sacramento rivers water temperature models, and Reclamation's American and Sacramento rivers early-lifestage Chinook salmon mortality models. For additional information on the above models, please refer to Appendix D (Fish Resources and Aquatic Habitat).

Model Simulations

Model simulations were developed to represent existing and future hydrologic conditions with and without implementation of the Proposed Action. The simulations were then compared to identify the potential changes in the CVP/SWP hydrologic conditions (i.e., instream flow, reservoir elevations, end-of-month storage, and water temperature) that could influence environmental resources. The evaluation of environmental impacts was performed by considering the modeling results from the comparison in light of the impact indicators and significance criteria developed for each resource topic.

Three simulations scenarios are used to perform the cumulative analysis:

Existing – The existing or baseline condition simulation represents the SMUD diversion at Folsom South Canal under existing practices. The recent historical maximum annual diversion amount for SMUD is 15 TAF, consisting of water rights supply only. This baseline condition provides the analysis comparison for the overall cumulative effect evaluation.

Cumulative Condition – The cumulative condition simulation includes all reasonably foreseeable future demands including implementation of the Proposed Action, increasing the SMUD annual Folsom South Canal diversion to 30 TAF, with 15 TAF water rights supply and 15 TAF CVP M&I supply subject to water year delivery restrictions. This simulation includes future build-out demands by all purveyors, subject to delivery restrictions defined through known agreements such as the Water Forum, as well as any reasonably foreseeable system operational changes or environmental obligations. The cumulative condition simulation incorporates all relevant existing Biological Opinions.

Cumulative without the Proposed Action (Incremental) – The cumulative without the Proposed Action simulation incorporates all reasonably foreseeable demands with the exception of the future SMUD CPP demand. Under this model simulation, the maximum annual diversion

amount for SMUD at Folsom South Canal is 24.68 TAF, with 15 TAF water rights supply and 9.68 TAF CVP M&I supply subject to water year delivery restrictions.

Impact Assessment Comparisons

The following comparisons were performed to assess the potential cumulative and incremental effects of the Proposed Action.

Cumulative vs. Existing – Identifies the cumulative impacts of all reasonably foreseeable actions related to the Action Area. A permanent power plant facility with an annual diversion amount of 5,320 AF under future conditions was compared to permanent power plant facility with an annual diversion amount of 5,320 AF under existing conditions.

Cumulative vs. Cumulative without the Project – Identifies, in a future context, the potential impacts and benefits of installing the proposed power plant facility. A permanent SMUD power plant facility with an annual diversion amount of 5,320 AF subject to dry year restrictions from Folsom South Canal was compared to the existing condition with no SMUD power plant diversion.

By using 5,320 AF/year for cooling, the CPP project would incrementally contribute to a regional increase in water demands from the baseline condition. However, historically this water was a portion of the water that was used during the operation of the Rancho Seco Nuclear Generation Station (1973 to 1989). Currently the Rancho Seco Nuclear Generating Station uses approximately 15,000 AF/year to support ongoing decommissioning activities. This equates to approximately 20 cfs. The operation of the CPP would utilize approximately 440 AF/month (14.7 AF/day, 7.3 cfs). This amount is unmeasurable in the hydrologic simulation modeling performed as part of this assessment. The total water used at the Rancho Seco site for decommissioning and the operation of the CPP will be approximately 27.3 cfs and was unmeasurable in the hydrologic simulation modeling performed as part of this assessment.

The 70-year and 69-year periods of record for the hydrologic and temperature modeling, respectively, (Appendix D, Fish Resources and Aquatic Habitat) were used to analyze potential cumulative effects of the Proposed Action on fish resources and aquatic habitat. Analyses were performed to compare estimated flows and water temperature within the lower American and Sacramento rivers, and X2 location each month over the 1921-1991 (hydrologic) and 1922-1990 (water temperature) modeling periods. For each analysis, a monthly comparison was made of the cumulative condition, which consists of all reasonably foreseeable projects including the Proposed Action until the year 2020, to the existing condition. Embedded in this analysis is the comparison between the Cumulative Condition and the Cumulative without the Project Condition. The Cumulative Condition without the Project simulates the Proposed Action's incremental contribution to the cumulative condition. In other words, it illustrates the contribution that the Proposed Action's diversion of a yearly average of 7.35 cfs (monthly average ranging from 6.5 cfs to 8.9 cfs) would have on the cumulative condition. Changes in the long-term (69-year and 70-year) average were then evaluated as part of the analysis.

4.2.3B Flow-Related Effects

4.2.3.1B Impacts To Fall-Run Chinook Salmon and Steelhead in the Lower American River

Modeling results show that flows at Watt Avenue are reduced during the October through February adult fall-run Chinook salmon spawning and incubation period under the cumulative condition relative to the existing condition. Long-term average flow at Watt Avenue would decrease 14.3 percent during October, 12.3 percent during November, and 8.5 percent during December. During the remaining months of the adult fall-run Chinook salmon incubation period, long-term average flow at Watt Avenue would decrease 2.4 percent during January, and 3.1 percent during February under the cumulative condition relative to the existing condition.

During the March through June juvenile fall-run Chinook salmon and steelhead rearing period, long-term average flow at Watt Avenue would decrease 4.2 percent during March and 6.3 percent during May under the cumulative condition relative to the existing condition. During the remaining months of the juvenile fall-run Chinook salmon and steelhead rearing period, long-term average flow decreases at Watt Avenue would range from 1.6 to 2.6 percent under the cumulative condition relative to the existing condition.

During the over-summer juvenile steelhead rearing period (July through September), long-term average flow at Watt Avenue would decrease 7.9 percent during July, 10.9 percent during August, and 16.4 percent during September under the cumulative condition relative to the existing condition.

Reductions in flow under the cumulative condition relative to the existing condition could adversely affect adult fall-run Chinook salmon spawning habitat availability, juvenile fall-run Chinook salmon and steelhead rearing habitat availability, and over-summer juvenile steelhead rearing habitat availability in the lower American River.

Incremental Contribution to the Cumulative Condition

Modeling was conducted to evaluate the incremental contribution of the Proposed Action to significant cumulative effects. Modeling results indicate that the incremental contribution of the Proposed Action to cumulative flow reductions during the adult fall-run Chinook salmon spawning and incubation period would be negligible. During the adult fall-run Chinook salmon spawning and incubation period, the incremental contribution of the Proposed Action comprises 0.3 percent or less of the cumulative long-term average monthly mean flow reductions at Watt Avenue.

During the March through June juvenile fall-run Chinook salmon and steelhead rearing period, the incremental contribution of the Proposed Action to the cumulative condition would consist of a reduction in the long-term average flow at Watt Avenue of 0.3 percent during April, and an increase in the long-term average flow at Watt Avenue of 0.1 percent during May. During the remaining months (March and June) of the juvenile fall-run Chinook salmon and steelhead rearing period, the incremental contribution of the Proposed Action to cumulative long-term average monthly flow reductions at Watt Avenue would consist of a 0.2 percent decrease.

During the over-summer juvenile steelhead rearing period (July through September), the incremental contribution of the Proposed Action to the cumulative condition would consist

of a reduction in the long-term average flow at Watt Avenue of 0.4 percent during July, 0.1 percent during August, and 0.2 percent during September.

Based on these findings, the incremental contribution of the Proposed Action to the cumulative condition would not adversely affect adult fall-run Chinook salmon spawning and incubation, juvenile fall-run Chinook salmon and steelhead rearing, or over-summer juvenile steelhead rearing.

4.2.3.2B Impacts to Splittail in the Lower American River

Modeling results show that flows at Watt Avenue are reduced during the February through May adult splittail spawning period under the cumulative condition relative to the existing condition. Long-term average flow at Watt Avenue would decrease 4.2 percent during March and 6.3 percent during May. During the remaining months (February and April) of the adult splittail spawning period, long-term average monthly flow at Watt Avenue would decrease 3.1 percent during February and 1.6 percent during April under the cumulative condition relative to the existing condition. As a result, the amount of inundated riparian habitat between RM 8 and RM 9 on the lower American River would be reduced for each month of the February through May adult splittail spawning period, particularly during April (11 percent) and May (8.3 percent) under the cumulative condition relative to the existing condition. Reductions in flow under the cumulative condition relative to the existing condition could adversely affect adult splittail spawning habitat availability in the lower American River.

Incremental Contribution to the Cumulative Condition

Modeling was conducted to evaluate the incremental contribution of the Proposed Action to significant cumulative effects. Modeling results indicate that the incremental contribution of the Proposed Action to the cumulative condition would result in no reduction in the average long-term usable inundated riparian habitat for any month of the February through May adult splittail spawning period.

Based on these results, the incremental contribution of the Proposed Action to the cumulative condition would not adversely affect adult splittial spawning habitat availability in the lower American River.

4.2.4B Water Temperature-Related Effects

4.2.4.1B Impacts to Fall-Run Chinook Salmon and Steelhead in the Lower American River

Modeling results show that water temperatures at Watt Avenue are higher during the March through June juvenile fall-run Chinook salmon and steelhead rearing period under the cumulative condition relative to the existing condition. Long-term average water temperature at Watt Avenue would increase 0.3°F in May, and 0.1°F in June under the cumulative condition relative to the existing condition. During the remaining months (March and April) of the juvenile fall-run Chinook salmon and steelhead rearing period, long-term average water temperature at Watt Avenue would not differ under the cumulative condition relative to the existing condition.

During the July through September over-summer juvenile steelhead rearing period, long-term average water temperature at Watt Avenue would increase 0.2°F in July and 0.1°F in

August under the cumulative condition relative to the existing condition. In September, long-term average water temperature would decrease 0.2°F under the cumulative condition relative to the existing condition.

Increases in water temperature during July and August under the cumulative condition relative to the existing condition could adversely affect juvenile fall-run Chinook salmon and steelhead rearing and over-summer juvenile steelhead rearing in the lower American River.

Incremental Contribution to the Cumulative Condition

Modeling was conducted to evaluate the incremental contribution of the Proposed Action to significant cumulative effects. The modeling results show that the Proposed Action would not incrementally contribute to long-term average monthly water temperature increases at Watt Avenue during May or June.

During the July through September over-summer juvenile steelhead rearing period, the incremental contribution of the Proposed Action to the cumulative condition would result in no difference in long-term average monthly mean water temperatures at Watt Avenue during August. Also, the incremental contribution of the Proposed Action to the cumulative condition would consist of an increase in long-term average monthly mean water temperatures at Watt Avenue of 0.1°F during July, and a decrease in long-term average monthly mean water temperatures at Watt Avenue of 0.1°F during September.

Based on these results, the incremental contribution of the Proposed Action to the cumulative condition may affect, but would not adversely affect juvenile fall-run Chinook salmon rearing, or over-summer juvenile steelhead rearing.

4.2.4.2B Impacts to Upper Sacramento River Fisheries

Modeling results show that under the cumulative condition, there are several additional months when water temperatures exceed 56°F or 60°F at Keswick Dam or Bend Bridge relative to the existing condition. There would be 22 more occurrences where the 56°F index would be exceeded, and eight more occurrences where the 60°F index would be exceeded at Keswick Dam relative to the existing condition. At Bend Bridge, there would be 31 more occurrences where the 56°F index would be exceeded and seven more occurrences where the 60°F index would be exceeded relative to the existing condition. Therefore, the cumulative condition would result in significant additional exceedances of the water temperature criteria identified in the NMFS Biological Opinion for winter-run Chinook salmon.

In addition, the cumulative condition relative to the existing condition would result in decreases in long-term early-lifestage survival of winter-run, fall-run, spring-run and late fall-run Chinook salmon. Winter-run Chinook salmon long-term average early-lifestage survival would be 93.4 percent under the cumulative condition compared to 96 percent under the existing condition. For fall-run Chinook salmon, long-term average early-lifestage survival would be 86.2 percent under the cumulative condition compare to 89.6 percent under the existing condition. Spring-run Chinook salmon long-term average early-lifestage survival would be 81.7 percent under the cumulative condition compared to 87.5 percent under the existing condition. The long-term average early-lifestage survival for late fall-run

Chinook salmon would be 98.7 percent under the cumulative condition compare to 99.1 percent under the existing condition.

Based on these conditions, water temperature related effects under the cumulative condition relative to the existing condition could adversely affect fisheries resources in the upper Sacramento River.

Incremental Contribution to the Cumulative Condition

Modeling was conducted to evaluate the incremental contribution of the Proposed Action to significant cumulative effects. Modeling results indicate that the incremental contribution of the Proposed Action to the cumulative condition would result in only one additional month (October) throughout the entire simulation where the water temperature would exceed 56°F below Keswick Dam, although this occurrence represented an increase of only 0.1°F (from 56.0 to 56.1°F).

Modeling results also show that the incremental contribution of the Proposed Action to cumulative long-term average early-lifestage survival of winter-run, fall-run, spring-run and late fall-run Chinook salmon would be negligible. The incremental contribution of the Proposed Action to the cumulative condition would result in no difference in the long-term average early-lifestage survival of winter-run or late fall-run Chinook salmon. The incremental contribution of the Proposed Action to the cumulative condition would consist of a reduction in the long-term average early-lifestage survival of 0.1 and 0.2 percent for fall-run and spring-run Chinook salmon, respectively.

Based on these results, temperature-related effects associated with the incremental contribution of the Proposed Action to the cumulative condition would not adversely affect fish species in the upper Sacramento River.

4.2.4.3B Impacts to Lower Sacramento River Fisheries

Modeling results indicate that water temperatures at Freeport in the lower Sacramento River are higher under the cumulative condition relative to the existing condition. The number of years that water temperatures at this location would exceed 56°F, 60°F and 70°F would be greater (i.e., 2 occurrences more often for the 56°F index, 11 occurrences more often for the 60°F index, and 9 occurrences more often for the 70°F index) than the existing condition during the period of March through November. In addition, 18 percent of the time in the months of March through November, the monthly mean water temperature at Freeport would increase more than 0.3°F under the cumulative condition relative to the existing condition.

Increases in water temperature under the cumulative condition relative to the existing condition could adversely affect fish species in the lower Sacramento River.

Incremental Contribution to the Cumulative Condition

Modeling was conducted to evaluate the incremental contribution of the Proposed Action to significant cumulative effects. Modeling results indicate that the incremental contribution of the Proposed Action to the cumulative condition would result in a slight increase in the number of years that water temperatures at Freeport would exceed 60°F and 70°F (i.e., one occurrence more often for both the 60°F index and the 70°F index). Nonetheless, the

incremental contribution of the Proposed Action to the cumulative condition would result in essentially equivalent monthly mean water temperatures at Freeport in the lower Sacramento River for all of the 828 months included in the analysis.

Based on these findings, the incremental contribution of the Proposed Action to the cumulative condition would not adversely affect fish species in the lower Sacramento River.

4.2.5B Delta Fishery Impacts

4.2.5.1B Impacts to Delta Fish Populations

Modeling results show that Delta outflow is reduced during the February through June period considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species in the Delta. Delta outflow would decrease by 10 percent or more, 11 percent of the time for the February through June period under the cumulative condition relative to the existing condition. In addition, during the February through June period, the upstream shift in the position of X2 under the cumulative condition relative to the existing condition would exceed one km 11 percent of the time.

Decreases in Delta outflow and upstream shifts in the position of X2 under the cumulative condition relative to the existing condition could adversely affect Delta fish populations.

Incremental Contribution to the Cumulative Condition

Modeling was conducted to evaluate the incremental contribution of the Proposed Action to significant cumulative effects. Modeling results indicate that the incremental contribution of the Proposed Action to the cumulative condition would result in only one individual month (i.e., May) throughout the entire 70-year period of record when Delta outflow is reduced by as much as two percent for the February through June period. In addition, the incremental contribution of the Proposed Action to the cumulative condition would not result in a shift in the long-term average position of X2 for any given month.

Based on these results, the incremental contribution of the Proposed Action to the cumulative condition would not adversely affect Delta fish populations.

4.2.6B Conclusion

Based upon results of these analyses, it was concluded that the incremental contribution of CPP operations to cumulative flow, water temperature and Delta X2 location effects may affect, but would not be likely to adversely affect, protected fish species and their habitat, or EFH, within the lower American River, Sacramento River, or Delta (Appendix D, Fish Resources and Aquatic Habitat).

4.3B Growth-Inducing Effects

Urban growth is the general trend for the Sacramento County region of the Central Valley, and with continued residential development there has been a general increase in urban (M&I) water demands from the CVP/SWP. Water supply demands are particularly offset by reduced agricultural water use (i.e., through conservation programs), which is the dominant land use displaced by residential development. The USBR, the CVP contractors, the SWRCB and other agencies are in the process of implementing methods to supplement and share

regional water resources. Most notable in the Sacramento area is the Water Forum, which is a diverse group of forty-four members including business, agricultural, environmental, citizen groups, water managers and local agencies. In addition, the Sacramento Area Flood Control Agency (SAFCA) is the state agency primarily responsible for flood protection, and sponsors a number of studies and developments that affect the management and transport of lower American River water (e.g., SAFCA Folsom Dam Modification Report New Outlets Plan).

The CPP is needed to serve the growing electrical demand in the Sacramento region, as well as to improve reliability and voltage support for all of Northern California. SMUD has an obligation to serve all electric power demands in its territory and therefore, must secure additional supplies to serve current and anticipated electrical needs. Thus, construction and operation of CPP does not encourage or induce growth.

5.0B General Protection and Conservation Measures of the CPP Project – Fishery Resources

Many of the potential effects to protected fishery resources and their habitat would be avoided through implementation of general construction management practices. The following measures would be implemented for all proposed action impact areas. These measures would help to avoid and minimize effects to protected fish species, critical habitat, and EFH for Pacific salmon. The CPP project would:

- Prepare a Biological Resource Mitigation Implementation and Monitoring Plan (BRMIMP) that details how the protection and mitigation measures will be implemented. The BRMIMP is a document required by the California Energy Commission (CEC) that also describes the responsibilities of the Compliance Manager, who oversees all compliance measures required for the project, the Designated Biologist who oversees compliance with biological mitigation measures, and the Biological Monitor who oversees construction activities on the ground. The Designated Biologist also submits daily logs and monthly compliance reports to the CEC. Any necessary monitoring reports are submitted to the CEC and relevant agencies.
- Provide worker environmental awareness training for all construction personnel. Training would include identification of sensitive biological resources that may occur in construction areas and measures required to minimize project impacts during construction and operation.
- Avoid and minimize impacts to sensitive habitats and species during construction by designating exclusion zones with temporary fencing, flagging, and/or signs that restrict construction activity or access.
- Provide mitigation construction monitoring by qualified biologists during construction activities near sensitive habitats and resources. Prohibit ground disturbance until the Biological Monitor has monitored or surveyed the area for sensitive species and determined the appropriate timing to proceed.
- Minimize extent of habitat disturbance. Require that construction activities be limited to existing roads, access points, and construction zones developed in coordination with qualified biologists as specified in final approved construction plans and documents. Prohibit ground disturbance until cleared by the Biological Monitor (see number 4 above). Where possible along linear pipeline alignments, use the alignment itself as the access route. Prohibit access to construction zones from off-road routes. Prohibit off-road traffic outside designated project areas.

- Prohibit refueling or storage of hazardous materials 100 feet from "waters of the U.S." or waters of the state. For portable equipment that uses fuels or lubricants, use Visqueen or other containment material under the equipment to capture leaks or spills.
- Construct and install the gas pipeline using HDD techniques at stream crossings on the Cosumnes River, Badger and Laguna creeks. Installation of the gas pipeline below the water channels would avoid obstruction of channel flow or impairment of Chinook salmon, steelhead, or splittail passage/movement for the life of the proposed action. In addition, construction and installation of the pipeline would occur during summer months to further minimize potential effects in the Cosumnes River watershed on steelhead, EFH for Pacific salmon, and splittail. Construction periods for the pipeline installation are identified in Table 10.

TABLE 10
Proposed Work Windows for Special-Status Fishes in the CPP Project Area

Species name	Location	Active Period	Proposed Biological Construction Window
Chinook salmon and steelhead	Cosumnes River, American River and tributaries	November to June	August through October (dry season)
Sacramento splittail	Cosumnes River, American River and tributaries	December to July	August through October (dry season)

Reference: California Department of Fish and Game 1601 Streambed Alteration Agreement (Ref R2-2002-246).

5.1B Protection of Fish and Aquatic Species in Waterways

The Cosumnes River and tributaries support Chinook salmon, steelhead, and Sacramento splittail (Section 2.0B). Protection measures were developed for the CPP project to prevent sediments and construction debris from entering waterways through a site-specific erosion control and restoration plan (Preliminary Draft Stormwater Pollution Prevention Plan, dated May 6, 2002.). Silt fencing and/or other sediment controls will be used at each construction location, including the stormwater outfall. Stormwater during construction and operation at the CPP site will be discharged according to the NPDES permit. The discharge will be monitored according to the requirements of the permit.

The use of HDD for constructing the gas pipeline under the Cosumnes River, Badger and Laguna creeks, and Cosumnes Preserve will minimize impacts to the fish and aquatic habitat. Potential effects could occur if inadvertent returns of drilling mud (frac-out) enter the waterway through a fissure or crack in the soils. The drilling mud (normally bentonite) is a non-toxic clay material often used as an impervious layer in wetland construction and by farmers as a soil enhancement. When drilling mud enters a waterway, it can smother benthic invertebrates, aquatic plants, fish eggs, and young fish. A contingency plan has been developed for the CPP HDD activities and is presented in Appendix C, Contingency Plan for Horizontal Directional Drilling. The plan outlines how an inadvertent return of drilling mud will be minimized, contained, and cleaned up. Prior to construction, the plan will present emergency contact numbers and a spill response team to contact in case of excessive spills. Key points include:

- A Biological Monitor will be on-site or on-call during the HDD and will assist SMUD in monitoring for frac-outs during the drilling operation. The Biological Monitor will consult with CDFG, NMFS, and USFWS and assist in coordinating the containment and clean up of spilled drilling mud.
- HDD equipment and materials will be located at least 150 feet from the outer edge of the Cosumnes River and Badger and Laguna creeks riparian corridors.
- Construction under the waterways would occur during the dry season (August through October) when salmon and steelhead are not expected to be in the river and creeks (because of low flow levels) in the vicinity of construction activity.

Other measures associated with the design and operation of the CPP project include the following:

- Design and operation of a stormwater detention basin and discharge outfall structure to Clay Creek. The outfall from the basin would be designed to incorporate measures to reduce contaminants, consistent with stormwater requirements, and with a flow dissipater structure equivalent to reduce velocity and potential scouring from the outfall. These elements would minimize the potential for introduction of water quality constituents of concern into the local watershed.
- Design and operation of a Zero-liquid Discharge (ZLD) system that would process all of the wastewater produced by the plant, returning a relatively high quality distillate stream for reuse in the plant and producing a solids waste stream suitable for disposal in a landfill. Incorporation of the ZLD system prevents introduction of waste products into the local watershed, thereby avoiding the potential for related water quality and aquatic resources effects.

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6.0B Conclusion and Determination of Project Effects on Protected Fish Species, Critical Habitat, and Essential Fish Habitat for Pacific Salmon

Results of this assessment support a conclusion that construction and operation of the proposed CPP ***may affect, but would not likely adversely affect***:

- Protected fish species including winter-run Chinook salmon, spring-run Chinook salmon, steelhead, Sacramento splittail, and delta smelt within the action area;
- Critical habitat in the Sacramento River for winter-run Chinook salmon;
- Critical habitat in the Sacramento River and Delta for delta smelt; and
- EFH for Pacific salmon in the lower American River, Sacramento River, Cosumnes River and tributaries, and Delta.

These findings are based, in part, upon results of a 70-year hydrologic simulation modeling of the proposed action compared to baseline conditions (e.g., including operations in compliance with existing BOs and other State and federal regulations).

The erosion control and contingency planning to protect water quality during project construction, in combination with standard BMPs and other measures designed to avoid and minimize scour and erosion associated with stormwater discharges from the site will minimize/prevent degradation of water quality and related potential effects upon aquatic resources. The findings also are based on consideration of proposed construction techniques for the gas pipeline and the use of HDD construction techniques to avoid obstructions to fish migration in the Cosumnes River and tributaries. The assessment also recognizes the ZLD approach/design for cooling water system operations that would avoid water quality effects resulting from CPP operations. Lastly, results of the hydrologic modeling indicated no detectable changes in lower American River instream flows or water temperatures; Sacramento River instream flows; or the location of X2 in the Delta as a result of the proposed action. The results of these analyses are consistent and support a finding that the proposed action ***may affect, but is not likely to adversely affect*** protected fish species, critical habitat, or EFH for Pacific salmon.

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7.0B References

The following references either are specifically cited in the text or generally were used to support the evaluation of fish resources and aquatic habitat effects.

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TABLE 1
Special-Status Species Potentially Occurring in the Proposed Cosumnes Power Plant Project Area, Their Status, and Determination of Potential Project Affect

Species Name	Status*	Habitat†	Not likely to Affect	May Affect	Comments
PLANTS AND HABITATS					
Slender orcutt grass *Orcuttia tenuis*	FT	VP	X		Species is known from pools east of Rancho Seco site
Sacramento orcutt grass *Orcuttia viscida*	FE	VP	X		Species known from vernal pools near Rancho Seco
Fleshy (=succulent) owl's clover *Castilleja campestris* ssp. *succulenta*	FT	VP	X		Not known from Sacramento County
Boggs Lake hedge-hyssop *Gratiola heterosepala*	CE, 1B	VP	X		Not known from project site.
Valley sagittaria (Sanford's arrowhead) *Sagittaria sanfordii*	SC	AW, VP		X	Not known from project site, could occur in wetlands along pipeline.
Legenere *Legenere limosa*	SC, 1B	VP		X	Species is known from Badger Creek and Laguna Creek
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	SC	CM		X	Species is known from Badger Creek and Cosumnes River
Mason's lilaeopsis *Lilaeopsis masonii*	SC	CM, CR		X	Species may occur in Cosumnes and Badger confluence area.
INVERTEBRATES					
Antioch Dunes anthicid beetle *Anthicus antiohensis*	SC	Sandy soils	X		No suitable habitat
Sacramento anthicid beetle *Anthicus sacramento*	SC	Sandy soils	X		No suitable habitat
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	SW		X	In vernal pool north of CPP site and in seasonal ponding areas along gas pipeline
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	SW		X	In vernal pool north of CPP site and in seasonal ponding areas along gas pipeline
California linderiella *Linderiella occidentalis*	SC	VP		X	In vernal pool north of CPP site and in seasonal ponding areas along gas pipeline

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Midvalley fairy shrimp *Branchinecta mesovallensis*	SC	VP		X	Could occur along with other vernal pool species, no surveys conducted for this species.
Conservancy fairy shrimp *Branchinecta conservatio*	FE	SW	X		Distribution is outside project area
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	elderberry shrubs		X	Scattered shrubs along gas pipeline alignment near Elk Grove Blvd.
FISH					
Winter-run Chinook salmon *Oncorhynchus tshawytscha*	FE, SE	migration, CR	X		May occur seasonally in Cosumnes River. Construction will avoid water.
Spring-run Chinook salmon *Oncorhynchus tshawytscha*	FT	migration, CR	X		May occur seasonally in Cosumnes River. Construction will avoid water.
Fall/late fall -run Chinook salmon *Oncorhynchus tshawytscha*	C	migration, CR	X		May occur seasonally in Cosumnes River. Construction will avoid water.
Delta smelt *Hypomesus transpacificus*	FT, ST	Downstream of CR	X		May occur seasonally in Cosumnes River. Construction will avoid water.
Central Valley steelhead *Oncorhynchus mykiss*	FT	migration, CR	X		May occur seasonally in Cosumnes River. Construction will avoid water.
Sacramento splittail *Pogonichthys macrolepidotus*	FT	CR	X		May occur seasonally in Cosumnes River. Construction will avoid water.
Green sturgeon *Acipenser medirostris*	SC	CR	X		Species is not known from project area.
River lamprey *Lampetra ayresi*	SC	CR	X		Construction will avoid Cosumnes River.
Pacific lamprey *Lampetra tridentata*	SC	CR	X		Construction will avoid Cosumnes River.
Kern brook lamprey *Lampetra hubbsi*	SC	CR?	X		Construction will avoid Cosumnes River.

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Species Name	Status*	Habitat†	Not likely to Affect	May Affect	Comments
Longfin smelt *Spirinchus thaleichthys*	SC	CR	X		Construction will avoid Cosumnes River.
REPTILES AND AMPHIBIANS					
California tiger salamander *Ambystoma californiense*	C	AG, VP		X	Known records in 1.25 miles of CPP site, but not detected in surveys of gas line or project site
Western spadefoot toad *Scaphiopus hammondii*	SC/CSC	VP		X	
California red-legged frog *Rana aurora draytonii*	FT	W, pond	X		Not known from project area.
Foothill yellow-legged frog *Rana boylii*	SC	none	X		Not known from project area.
Giant garter snake *Thamnophis gigas*	FT, ST	AW, sloughs and creeks, CRP		X	Known to occur in sloughs ands ditches near Badger Creek and Cosumnes River along gas pipeline.
California horned lizard *Phrynosoma coronatum frontale*	SC	Sandy soil	X		Not known from this project area.
Western pond turtle *Clemmys marmorata*	SC	W, AW, CRP		X	Occurs in Clay Creek, Rancho Seco Reservoir, Cosumnes and tributaries.
BIRDS					
American bittern *Botaurus lentiginosus*	SC	Nesting, CRP, AW	X		Proposed action will avoid nest habitat in Cosumnes Preserve and potential for nesting near waterways
White-faced ibis *Plegadis chihi*	SC	Winter forage CRP, AW, flooded crop, pastures	X		May occur in Cosumnes seasonally.
White-tailed kite *Elanus leucurus*	SC, FP	Nesting, CRP, RI, AC, AG	X		Proposed action will avoid nests.
Bald eagle *Haliaeetus leucocephalus*	FT, SE	winter forage, CRP, AC, AG	X		May occur as winter migrant in region. Nearest historical record of nest 5 miles from project.
Swainson's hawk *Buteo swainsoni*	ST	Nesting, CRP, RI, AC, AG		X	At least 5 historical and current nests known to occur along pipeline.
Ferruginous hawk	SC	winter forage, AG	X		May occur in region during winter migration.

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Species Name	Status*	Habitat†	Not likely to Affect	May Affect	Comments
Buteo regalis					
Greater sandhill crane *Crus canadensis tabida*	ST, FP	winter forage, CRP, AC, AG		X	Cosumnes Preserve is major wintering area.
Mountain plover *Charadrius montanus*	PT	winter forage, CRP, AG	X		May forage in agricultural habitats as winter migrant.
Burrowing owl *Athene cunicularia hypugea*	SC/CSC	AG, CRP		X	Potential foraging habitat on project site and potential nesting habitat along gas pipeline. One pair observed during surveys at Sims Road.
Little willow flycatcher *Empidonax traillii brewsteri*	SC/SE	Willow riparian	X		May occur rarely in Cosumnes River Preserve.
Bank swallow *Riparia riparia*	ST	Steep banks along Sacramento River	X		No suitable habitat
Grasshopper sparrow *Ammodramus savannarum*	SC	AG, CRP	X		Suspected to nest occasionally in Cosumnes Preserve
Tricolored blackbird *Agelaius tricolor*	SC	CRP, AC, AG	X		Known to nest in Cosumnes Preserve
MAMMALS					
Small-footed myotis bat *Myotis ciliolabrum*	SC	R,CRP	X		Project would avoid all riparian habitat and remove no old buildings.
Long-eared myotis bat *Myotis evotis*	SC	R,CRP	X		Project would avoid all riparian habitat and remove no old buildings.
Fringed myotis bat *Myotis thysanodes*	SC	R, CRP	X		Project would avoid all riparian habitat and remove no old buildings.
Long-legged myotis bat *Myotis volans*	SC	R, CRP	X		Project would avoid all riparian habitat and remove no old buildings.
Yuma myotis bat *Myotis yumanensis*	SC	CRP, R	X		Project would avoid all riparian habitat and remove no old buildings.
Pacific western big-eared bat *Corynorhinust townsendii townsendii*	SC	R, CRP	X		Project would avoid all riparian habitat and remove no old buildings.
Pale Townsend's big-eared bat *Plecotus townsendii pallescens*	CSC, SC	R, CRP	X		Project would avoid all riparian habitat and remove no old buildings.

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Species Name	Status*	Habitat†	Not likely to Affect	May Affect	Comments
Greater western mastiff-bat *Eumops perotis californicus*	SC		X		Project would avoid all riparian habitat and remove no old buildings.
San Joaquin pocket mouse *Perognathus inornatus*	SC	AG	X		Project would avoid all riparian habitat and remove no old buildings.
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	FE	R	X		Not known to occur in project region.
Riparian brush rabbit *Sylvilagus bachmani riparius*	FE	R	X		Not known to occur in project region.
Ring-tailed cat *Bassariscus astutus*	FP	CRP, R	X		Project will avoid all riparian habitat.

* Federal, state, and CNPS listed species.
- FE: Federally Endangered
- FT: Federally Threatened
- SC: Federal Species of Concern
- PE: Federal Proposed Endangered
- PT: Federal Proposed Threatened
- SE: California Endangered
- ST: California Threatened
- CSC: California Species of Special Concern
- FP: California Fully-Protected species
- 1B: CNPS rare or endangered in California and elsewhere
- 2: CNPS rare or endangered in California, more common elsewhere

+ Abbreviations for habitat areas.
- CRP: Cosumnes River Preserve
- FM: freshwater marsh
- CR: Cosumnes River and tributaries
- AG: Annual grassland
- AW: Agricultural water conveyance canal
- AC: Agricultural crop
- R: Riparian
- VP: Vernal pool and seasonal wetlands on CPP project site and gas pipeline alignment

Note: The USFWS and CNDDB searches included the following 7 1/2 minute USGS topographic quadrangles: Clay, Goose Creek, Elk Grove, Florin, Bruceville, and Galt.

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Figures